Silver Lion - A Social Health App Empowering Seniors

Team Name : Project Lithium

Team Members

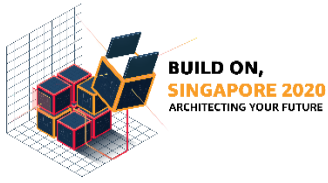|	
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General Brief

- Text should be Tahoma font size 11, line spacing of 1.5
- Ensure you have filled up your team name and team members details
- Keep this proposal to a minimum of 5 pages, maximum of 10 pages excluding cover page, content outline and appendix

Content Outline

Significance of problem

Isolation **Health** **False Information** **Singapore's Seniors**

The Covid-19 pandemic has had tremendous impacts on all segments of society, however our elderly and physical trainers were disproportionately hurt. Covid-19 has significantly higher fatality rates for the elderly, making it imperative that they minimise their social contact with the outside world. Physical trainers initially were unable to conduct classes, and now face stringent class size limits, which has been career shattering for many. This shift in lifestyle has been extremely stressful for many of the elderly Singaporeans we interviewed, and has led to them feeling isolated from the world around them. To better understand the problem, we conducted a series of interviews with members of the elderly community and some physical trainers.

We spoke to Mr. Adbul Hamin, 73, who enjoyed walking around his block with his friends and visiting Holland Village hawker center before the pandemic. He explained to us that he and his friends are still worried about leaving their houses because of the Covid risk, especially because some of them struggle to breathe with masks on. He has found this difficult because he misses his friends and struggles to keep in contact with them using technology. He has also been forced to adopt a more sedentary lifestyle due to lack of widely distributed elder home workout programs. Overall, he said "This pandemic has been very difficult for me, and I pray that Singapore is able to overcome it soon".

We also spoke to Mr. Goh, who played Badminton with his friends at Jurong East sports hall before the pandemic. He said, "I miss playing Badminton with my friends, we are scared to go out now". He noted that he feels very disconnected from the outside world and is struggling to fill his free time with interesting activities. When asked about his mental health, he said he was unhappy but doing alright. In response to a question about home workout apps to maintain his fitness, he said "There are no easy to use fitness apps that allow us to exercise alongside our friends".

Finally, we spoke to Mrs. Goh, who did Tai Chi and Qi Gong at Coronation Park before Covid-19. She told us that she missed having "Structured classes with the instructors she'd been learning from for years". When asked about elder health in general, she told us that misinformation was a large problem. Dubious articles about health tend to circulate her group chats, identifying strange risks like microwaving and drinking water with meals. She explained that these articles alarm her friends because they fear for their health and vulnerability. Her friends also struggled to verify or debunk these rumors because they are not tech-savvy.

We then spoke to a Badminton coach, Michael Lee. He told us he struggles to conduct his classes because of the intersection of safe distancing rules, class size limits and stringent safe entry regulations. He also said that his elderly clients are now afraid to attend classes. This has hurt his business and forced him to retrench a number of his coaches.

From these interviews we realised that the Covid crisis had been thoroughly debilitating for the elderly population. They are confined to their houses, struggling to stay in contact with their friends, worried about their fitness and about contracting Covid. It also highlighted the issue about health related chain-mail that is perturbing the elderly and could possibly injure them. This showed us that it was necessary to innovate a solution that catered to the elderly, helping their mental and physical health.

In addition to the elderly, sports instructors have been hugely affected by the pandemic. For a period of time, no classes could occur, especially not activities that require equipment and many lost their only source of income. Despite the resumption of coaching, physical trainers are still struggling. Class size limits of five people make the large community classes they used too impossible. Stringent safe entry measures are difficult for the elderly who are already scared to leave their houses. Sports instructors who once had their dream job, are now struggling to attract clients and make an income. We aim to not only solve this, but provide these instructors with the reach previously impossible.

Solutions Introduction

Pinpoint Target Market

Comprehensive Features

Meeting the exact need

Bringing the Community to you

Main Features

- Online health classes suited to senior citizens
- Built in video calling for classes
- Gain feedback and support from instructors in real time classes
- Read reputable health articles and have common myths debunked
- Comment on and discuss articles in forums
- Join classes with friends
- Small class sizes to maximise interaction and feedback
- Classes with local instructors from the community, who are familiar to the senior citizens
- No fuss, install single app with no dependencies

To solve this problem, we decided to create a comprehensive health app. This app will be available free of cost on the App store and Play store. Upon installing our app, users will take a brief quiz that will gauge their fitness level and assess their problem areas. They will then see a list of recommended fitness classes and will be able to sign up for them. These classes will be anything from Tai Chi and Qi Gong, to knee mobility exercise classes. Instructors who previously hosted exercise groups will host these classes online. There will be small class sizes and interaction between students and teachers. We will create this app with three objectives in mind. First, to promote individual health and fitness in the elder community. Second, to create a sense of
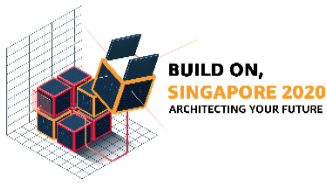
connectivity and community for the elderly who remain in isolation. Third, to combat the chain messages that spread rumors and provide science-backed advice instead.

To achieve our first objective of promoting individual health, our app will allow group fitness classes to be conducted on a video calling platform. This will enable the elderly to attend the fitness classes they have been attending for years. These classes would be held by instructors that the elderly are already familiar with, making transition much easier. These instructors would also be very experienced in helping elderly bodies improve. This style of teaching is most likely to benefit the elderly community's health, because we help them return to the structured classes they are used to, and give them the qualified instructors who are best equipped to help them.

We will meet our second objective by creating a sense of community in these classes. People will be able to do these classes with their friends and feel like they are part of the group. We will keep the class sizes relatively small to allow the instructor to provide support and encouragement to the students. The class will be set up in a way that the class attendees will be able to see only the instructor, however there will be a panel showing the rest of the members in the class. The instructor will teach from a large screened device, and will be able to see all the attendees of the class and give feedback. This will recreate the feeling of being in an exercise group that these elderly people are lacking, making them feel as if they are once again part of their communities and connected. Additionally, we will allow members to message each other on the platform and invite each other to classes and events, furthering that sense of community.

Our classes will make it easy for physical trainers to attract clients and make a living. This is because signing up for classes with them will be extremely easy through our app. Even after the Covid-19 pandemic, these online classes will have significant reach through the community. This will allow physical trainers to continue to teach online, increasing their revenue and decreasing the amount of effort they have to put in.

To meet our final objective of combating fake news, we will publish scientific health articles that are very applicable to the elderly. These articles will give the elderly a reputable source of information that will allow them to improve their health. We will also debunk common myths circulated on these group chats.

Impact of Solution

Newfound purpose	Reduced fake news	New Interactions	Improved Health

Our app will have tremendous impacts on the quality of life of senior citizens. Their mental and physical health will improve in conjunction because of our unique community-linked fitness. Users will be comforted by the familiar workout routines, with familiar coaches helping them feel as if they are back to their pre-Covid lives. We further connect in the community by making it very easy for friends to contact each other and participate in events together, helping people feel less isolated. We also help physical trainers grow their businesses in these trying times. This is because they now have greater reach and can accept more students without having to worry about class size limits, safe entry and elders not coming for classes.

Not only this, but users will meet with new coaches and participants further strengthening the sense of community that is currently missing. Participants will try new activities, develop friendships and find a new sense of belonging. When our users begin using our platform, in addition to finding it easier to find interesting and healthy activities, they will begin to enjoy the people there and stay around. The healthy articles also are a source of positive impact, users will no longer have to receive spam, incorrect health information from whatsapp chats, but now can view and share factual and beneficial health articles directly through our service.

Other solutions on the market simply do not offer this intersection of mental and physical wellbeing. There are multiple elder fitness apps available, however they are solitary and rely on you staying committed to hard work on your own. They do not offer connections to coaches and friends, which makes them less enjoyable and harder to stay committed to.

Many programs by the Singapore government have been launched such as HealthHub's elderly program and SG Actives masters & Seniors program, however these are held in person. They are unable to cater to the vast elderly population who remain afraid to go out. In the future, it would be mutually beneficial to collaborate with them to truly create the best possible immersive product for Singapore's Seniors.
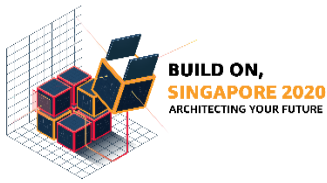
Another competitor is Eventbrite, which addresses the idea of connecting people to events, however for the elderly, there is too much rubbish for them to filter through to get to events which they want.

Finally, video sharing sites like Vimeo and Youtube post workout videos, however they do not provide the community engagement we do. They do not provide you with real time feedback or give you ability based exercises, something very dangerous for our senior citizens as any mistake while exercising could have serious health implications. We allow elderly citizens to work with the trainers they have spent years getting to know.

Our solution offers the unique selling point of being able to maintain community connections in Singapore and simultaneously keep our aging population fit and healthy. No other app brings the workout classes people have grown to love into their houses and lets them participate interactively with their friends. We safely bring the outside world to our suffering, isolated elderly.

Deep Dive into Solution

If you would like to better understand our product, you can interact with a rough concept app here: https://pr.to/OBGL8F/ . This concept includes basic features like viewing events and articles, as it is a concept app, it does not include online events and other more technical features. We've designed the app to be as user friendly as possible with a simple tab bar for navigation and large text allround.

We have currently created an IOS app using the same outline as the concept app above and you can view this in the video submission. In the future we hope to transition this to android as well.

Our app will be incredibly intuitive to use. Users will have their fitness assessed with a quiz which will determine problem areas, their general fitness levels and their preferred method of exercise. We will use a content-based filtering system to recommend classes for our users. Eventually, when we have more user data, we will also use collaborative filtering systems. This will mean that our users will have no trouble finding appealing classes. We will of course have a search function too, so users aren't limited to recommended classes.
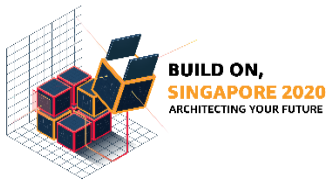
Our video calling will be hosted with Amazon Chime, which will hopefully make it easy for users to join meetings, with few dependencies. We will also use a host of other Amazon technologies for storage, data store and security; we will elaborate on this in the AWS architecture section.

The user-interface of our app is really easy to understand. We use large fonts and buttons, contrasting colors and limited text. This makes navigating the app intuitive and simple for even un-tech-savvy grandparents.

We have a variety of other small features, Users can quickly view today's health data including average heart rate, view their average heart rate over events they have taken part in, view an event calendar and get reminded for events, sharing of articles and events directly through the app and more.

In the future, we would also like to add a variety of other features including but not limited to: Suggestive Events and Articles, Forums, Payment for Events, In-built messaging with peers and instructors, more health data integration (More data shown on profile pages, analysis of data, use this to provide better events, disease preventive measures and more) and much much more.

Architecture of Solution

We are heavily reliant on AWS Services to create the backend of our product. We have two main parts, the mobile app and web app (which we plan to add when we scale). We are using a variety of AWS Services like S3, DynamoDB and Cognito to create a truly immersive experience for our clients. As shown in the diagram and descriptions below, we are primarily using EC2s for servers with 3 S3's for storage and 1 DynamoDB Database. We are also using Amazon's simple services and Chime SDK. We have chosen to use 2 sets of web and app servers so that we can easily scale based on demand. We have chosen to include the web app component in the diagram, but will not have enough time to implement it before the final submission. However, we feel it necessary to develop a web app in the future especially for online events. We have also included a variety of other features like user-engagement analysis and encryption using KMS.

For the mobile app, we are using AWS Amplify with Appsync and API Gateway. This allows us to create a truly cloud-based experience with local data syncing with the cloud whenever possible. In addition, we are using DynamoDB to store all events lists, article lists etc and linking it to a s3 bucket with a lambda. When we scale and add the web apps, we will need to include an additional elasticache database to cache popular data for

faster user queries. In addition, we would need to include a new s3 bucket and a lambda to connect the two in order to convert between mobile and web media formats.
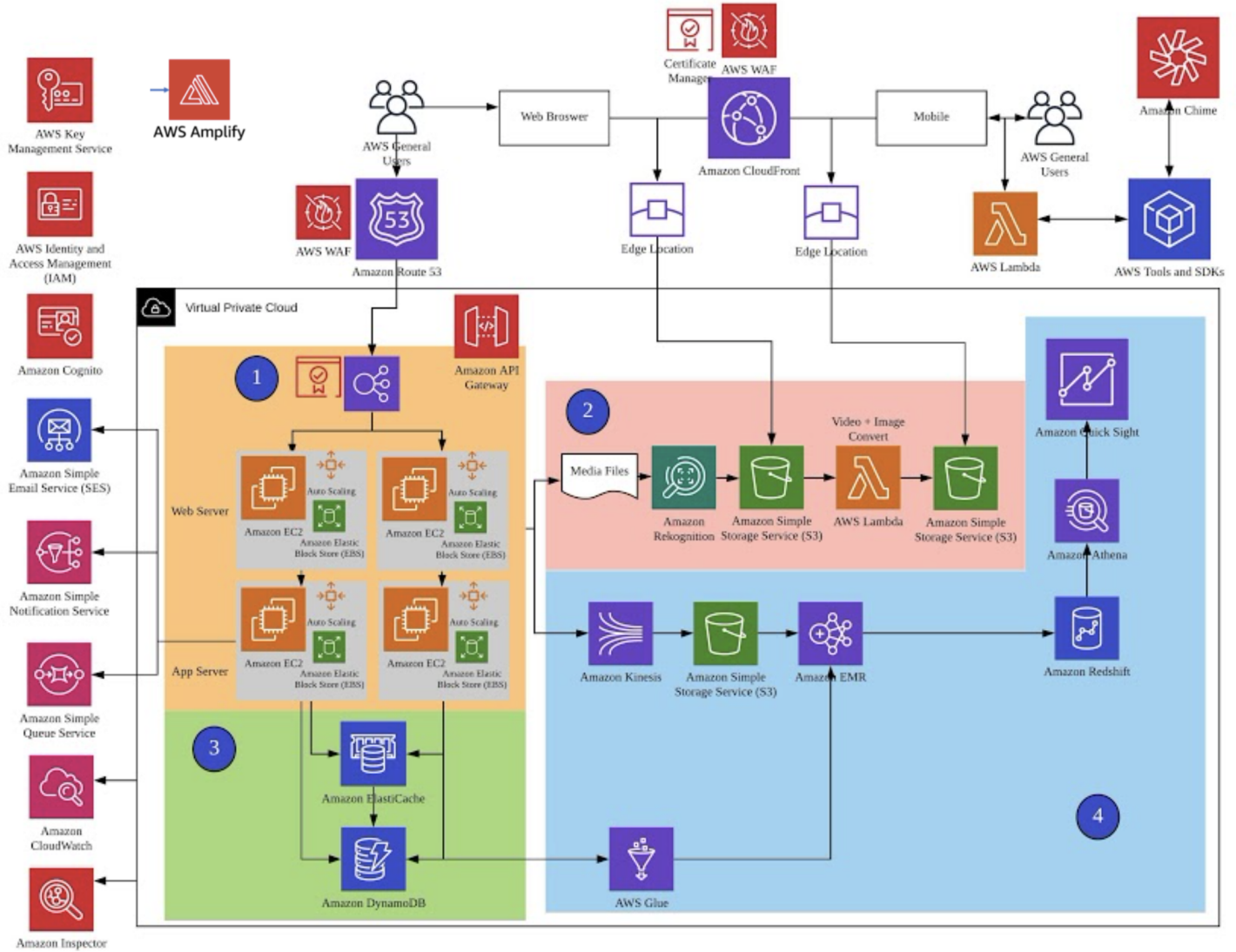
Security

We have a variety of measures to ensure security for our customers. We allow for sequire authentication with Amazon Cognito. We also are using AWS KMS and IAM to ensure greater security, escpeccially for messaging and online workout features. AWS WAF prevents any security breaches and certificate managers further protect our users. We are also using Amazon Inspector for greater security and constant survellience so that we can spot and fix any issues immediately.

Amazon Cognito: We will be using Cognito to verify our users and authenticate them to esnure a seamless UX across devices and platforms.

3 Database

Amazon ElastiCache: Improves memory speed by preventing bottlenecking. Allows quick access to popular data, eg. trending events

Amazon DynamoDB: This is the database where we will be storing all our data. In here will include profile info, history logs, lists of events and articles and more.

1 Web and App servers

Amazon EC2: Web service for cloud computing

Elastic Load Balancing: Balance the load distrubution between the two app and web servers

Auto-scaling: This will allow use to easily scale and adpat to user engagement. It will also help us acheive one of AWS' Pillars: Cost-Optimization

We have chosen to use a set up of 2 servers for web and app each to reduce any bottlenecks that may emerge and make the UX as smooth as possible. The app servers connect to mobile services like SES, SNS and SQS. All Servers connect to the databases and s3 as shown.

Others

Amazon SES, SNS, SQS: We will be using these services to deliver confirmation emails etc to users. We will also use it to notify users for friend requests for event reminders.

CloudWatch: Monitoring Dashboard for Servers and Databases

Amazon Chime: To Allow for seamless online workouts for users. We will be using Chime SDK to integrate the video conferencing directly into the app

Amazon Route 53: To link our domain and apps to AWS

Amazon Api Gateway: To allow clients to perform api requests more efficiently and allow the application to scale easily

AWS tools and SDKS: To extract the Chime SDK

CloudFront: Cacheing our Static Data

Edge location: Singapore has three of them allowing for faster upload and download speeds

2 Storage

Amazon S3: Simple storage used to store files externally, in our case event images, user profile photos etc. There are two buckets for media files (one for each web/mobile formats).

Amazon rekognition: To block inappropraite media

AWS Lambda: We are using Lambda to convert between web and mobile image and video formats to allow us to easily create a multiple platform product.

4 User Engangement Analysis + Click stream Analysis

We are using a kineses to extract server data and storing it in a S3 bucket. We are also using glue to attatch the database data and finally using EMR and Glue to proccess the data. We are then storing all this in Amazon redshift before performing analysis in Athena and displaying the results in Quick Sight. This allows us to understand what users are interacting most, what trends are forming in the community and more. This further allows for us to adapt our service, we can provide more suitable events, look at new article topics, and listen to customer feedback to just create a better experience for our customers.
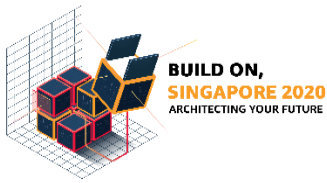
Going further

We aim to develop our app in three key areas in the future. The first is accessibility, the second is ease of use.

To increase our accessibility, we would translate the app into Malay, Tamil and Mandarin. It is very important we do this as the feedback from many of our interviews has been that currently users tend to stick where the language is most comfortable for us, and in a diverse country like Singapore, this is not always English. We could further increase accessibility by developing for different platforms. In addition, our initial development will be with Swift, however we will expand to the Play store and eventually to web browsers. This would make it easy for any elderly person to utilize our services.

The second area for improvement is ease of use. After our app has been deployed for some time, we would track user workout patterns. From this data, we would train a K-Nearest-Neighbours algorithm to recommend workouts for our users. We would also improve our integration with currently operating fitness centers in Singapore, such as SG active masters and seniors, perhaps allowing them to host a variety of programs on our app. Finally, to increase our ease of use, we would allow creators to publish their own health articles and host their own classes. This would make our app more scalable because we wouldn't have to manually select class hosts we approve of, and vet articles. We could instead allow people to apply to be writers and hosts and allow them to host or write as much as they want once they have approval.

Our solution is extremely scalable and viable as a business. As our popularity increases, more and more fitness trainers will sign up to host classes with us, allowing us to accept more and more users. After some popularity growth, we would begin to charge a small revenue based cut of 10% from instructors in order to fund further development of the app such as translation and AWS Fees. If we were to receive a grant or generate a steady income, we would then encourage more users to our platform by giving new users free credits, like what SGactive currently does.

Given that Singapore has been very enthusiastic in encouraging elder health, we hope to secure some funding and advertising from them to increase the adoption of our app by the community.

Appendix - Screenshots of the App
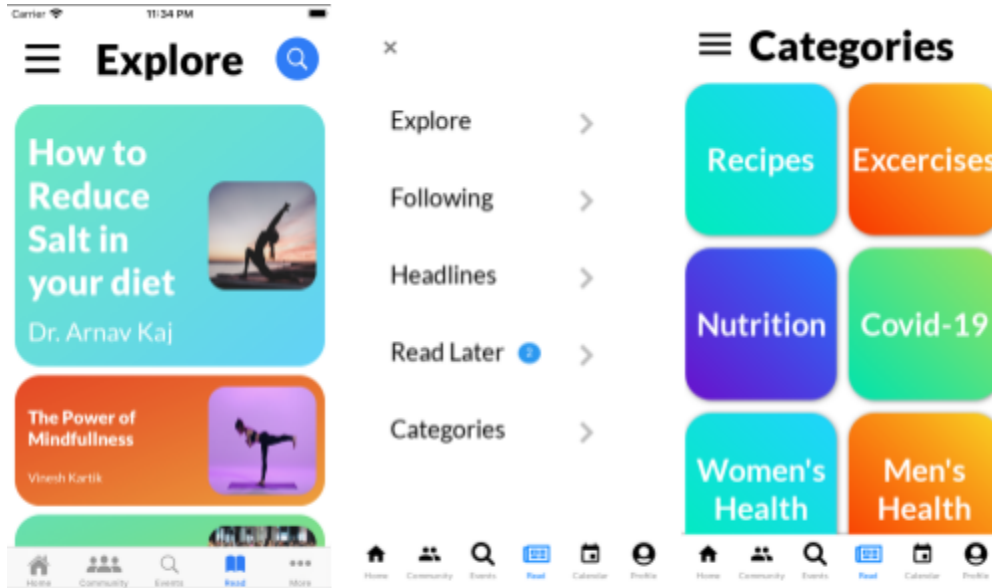
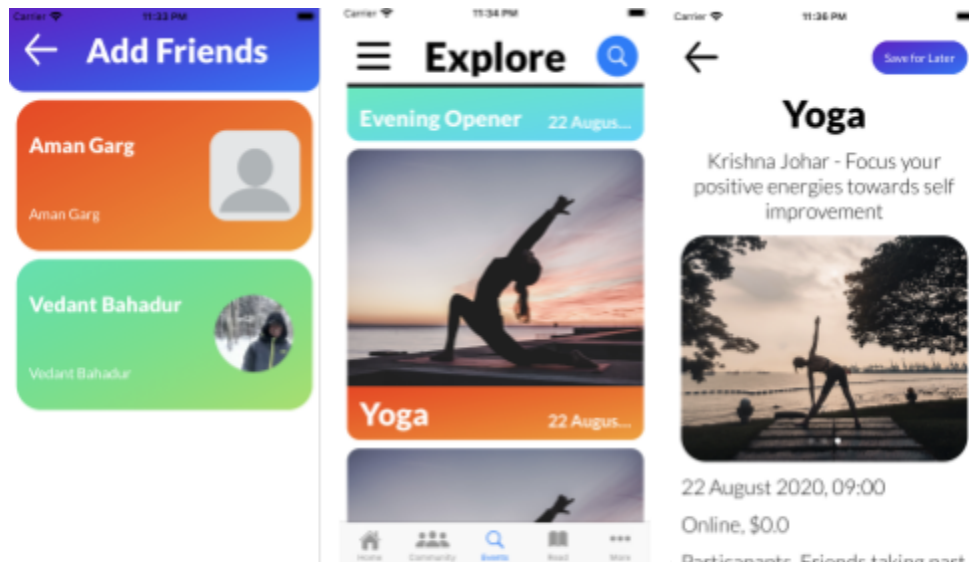Read Tab, view articles, save for later, search by categories etc
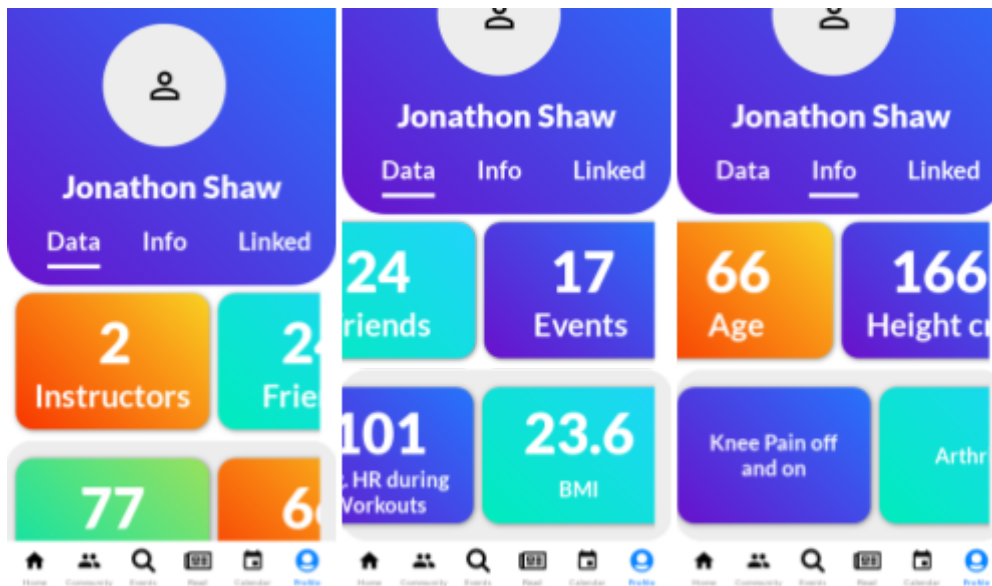
Profile Tab, view data for today or past history, view info stored
including pain points and link to healthkit and other accounts

Let's Get Active!

Upcoming Events

Yoga
Krishna Johar, Sat 10am Online

Evening
Maxine 6pm Online

Suggested Events

Zoomba
Joe Tan, 15th July 10am Online

Evening
Maxine July 6p Online

Home Page
(Events + Articles for you)

Friends Instructors

Join your Friends!

Eugine Chestre
Tommorow: Zoomba Morning Stretch

Ben B
Tomm Satur

Messages

Jennifer Marth
1 new invitation
2 new articles

Eugin
2 new
1 new

Add Friends!

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1 new

Add Instructors!

Community Tab, View activity/messages, Add new Friends/instructors

← Add Friends

Aman Garg
Aman Garg

Vedant Bahadur
Vedant Bahadur

Add friends

☰ Explore 🔍

Evening Opener 22 Augus...

Yoga 22 Augus...

Events tab

← Save for Later

Yoga

Krishna Johar - Focus your positive energies towards self improvement

22 August 2020, 09:00
Online, $0.0

Particioants, Friends taking part

Book events / Read articles

User Flow Chart