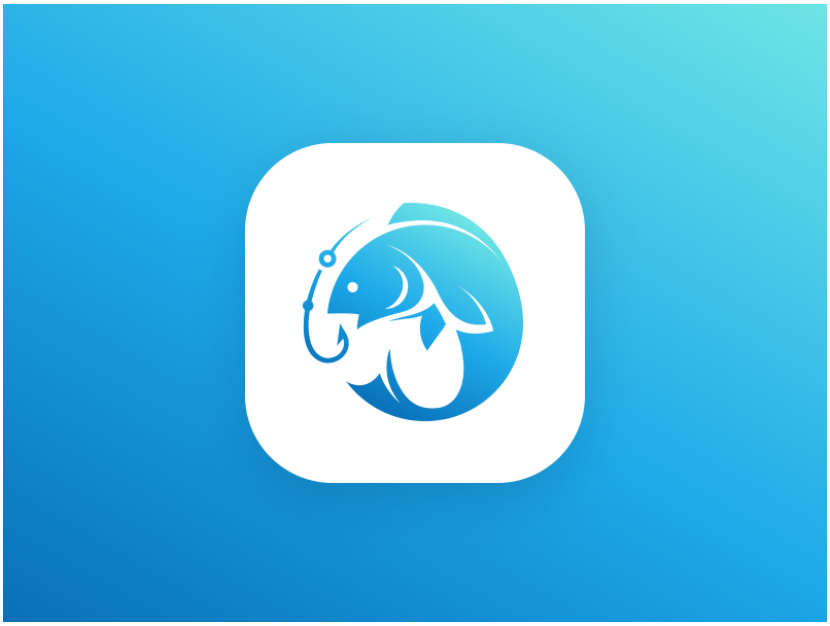
Department of Computer Science & Engineering
The University of Texas at Arlington

Project Charter
CSE 4316: Senior Design I
Fall 2022



Team Fish Quest
Fish Quest

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Revision History

Revision	Date	Author(s)	Description
0.1	09.26.2022	WS, OK, KP, BS, MZ	Document Creation
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1.0	12.13.2022	WS, OK, KP, BS, MZ	Updated Document (Revised Section (1-4), 7, 9, 14.3)
1.1	12.14.2022	WS, OK, KP, BS, MZ	Updated Burndown Chart
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CONTENTS

1 Problem Statement **6**

2 Methodology **6**

3 Value Proposition **6**

4 Development Milestones **6**

5 Background **7**

6 Related Work **7**

7 System Overview **8**

8 Roles & Responsibilities **9**

9 Cost Proposal **9**
9.1 Preliminary Budget 9
9.2 Current & Pending Support 9

10 Facilities & Equipment **10**

11 Assumptions **10**

12 Constraints **10**

13 Risks **11**

14 Documentation & Reporting **11**
14.1 Major Documentation Deliverables 11
14.1.1 Project Charter 11
14.1.2 System Requirements Specification 11
14.1.3 Architectural Design Specification 11
14.1.4 Detailed Design Specification 11
14.2 Recurring Sprint Items 11
14.2.1 Product Backlog 12
14.2.2 Sprint Planning 12
14.2.3 Sprint Goal 12
14.2.4 Sprint Backlog 12
14.2.5 Task Breakdown 12
14.2.6 Sprint Burn Down Charts 12
14.2.7 Sprint Retrospective 12
14.2.8 Individual Status Reports 13
14.2.9 Engineering Notebooks 13
14.3 Closeout Materials 13
14.3.1 System Prototype 13
14.3.2 Project Poster 13
14.3.3 Web Page 13

14.3.4 Demo Video 13
14.3.5 Source Code 13
14.3.6 Source Code Documentation 13
14.3.7 Installation Scripts 13
14.3.8 User Manual 13

List of Figures

1 Drawing of system overview 9
2 Sprint 4 burndown chart 12

1 Problem Statement

Fishing is a popular leisure activity that has existed since people have been grouping in civilizations near water, but the process of fishing has remained relatively unchanged since then. Because of this, anglers can start to lose interest and feel fishing is repetitive with the only real incentives to fish being the fish itself, which can become stale after too long. Particularly if you are unable to travel for different fishing areas, many anglers can get quite bored and give up on their hobby. Our team aims to make fishing feel more like a rewarding adventure in an attempt to revitalize a hobby which has seen a decline since the time of our parents and their parents. We also want to enable the fishing community to be more interconnected as fishing is sort of a more individual sport with small groups sometimes making it more difficult to get a good catch. By doing this, we hope to make fishing a much more enjoyable and exciting experience that will captivate both new and experienced anglers and a new layer of depth to this ancient hobby and breath new life into it.

2 Methodology

Our team will be creating a mobile iOS and android application for fishing that is heavily focused on social aspects and fishing related missions. Users will be able to log their catches and have the app identify the fish species caught. Our app will contain a traditional social feed page that displays recently logged catches. Other users can engage with these posts by liking and commenting. A map feature will be available and will display the locations of every previously logged catch. Lastly, the app will contain a missions menu that will generate different fishing related missions. Completing missions can grant achievement badges or various amounts of experience points that will level up the user's account.

3 Value Proposition

For starters, FishQuest will benefit all members in the fishing community by providing them with a platform that enhances their fishing experience through social and reward related features. Furthermore, FishQuest also has the potential to attract many non-anglers and influence them to become devoted members of the fishing community which will grow the community to the benifit of everyone. A stable and large fishing community will have major benefits for fishing related companies. Fishing is dependent on equipment such as rods, reels, hooks, line, and bait so if the community is large and actively fishing, then these products will be in high demand which will financially stimulate the recreational fishing industry.

4 Development Milestones

- Project Charter first draft - September 2022
- System Requirements Specification - October 2022
- Architectural Design Specification - November 2022
- Detailed Design Specification Document, Social Media Fee - Sprint 5
- Catch Logger - Sprint 6
- Map feature - Sprint 7
- Missions and Achievements - Sprint 8
- Final Project Demonstration - May 2023

5 BACKGROUND

The art of fishing has been a prominent aspect of human culture for thousands of years. Fishing initially started as a method of survival but over the years, transitioned into a popular recreational activity. Despite being around for a long time, fishing hasn't really evolved in terms of the typical routine that anglers follow. For most people, the common routine is to gather their equipment and then travel to a body of water where they cast their lines and must wait patiently for extended periods of time and hoping for fish to bite. More often than not, they receive no bites and all their efforts have gone to waste. This common practice of fishing and the undesirable results that follow are one of the many factors that cause many anglers to become bored, frustrated, and discouraged which deters them from fishing. For situations like this, the risk to reward ratio is low and creates little incentive to fish. Not only are these challenges intimidating for experienced anglers but also those who are new to fishing. This may also deter newer people from fishing which stunts the expansion of the fishing community. The FishQuest App will contain many social media and rewarding game-like features that will address these issues by revolutionizing the way that people fish and giving users a reason to fish.

The inclusion of social media features is something that is greatly needed within the fishing community. Fishing alone can sometimes feel lonely. Being able to connect with new people and fish with them can make fishing a much more exciting experience but sometimes this may be hard to do because of the lack of social media platforms related to fishing. This not only makes physically meeting other new anglers hard, but it also makes it difficult to stay virtually connected to the fishing community. Many mainstream social media platforms like Instagram, TikTok, and Facebook exist and may serve as a tool for anglers to stay connected but these platforms are not created for fishing. These platforms are meant to support many genres of content which causes fishing content to be diluted in the mix of other content, thus making it hard for the fishing community to indulge in fishing related content. With FishQuest, users will be able to enjoy a social media experience that is exclusive to fishing. FishQuest will serve as a beacon for fishing enthusiasts everywhere to stay in touch and enjoy fishing together.

As stated earlier, not being able to catch fish during a session is a major issue. Many factors could affect the the success of a fishing trip such as the location, time, weather, bait, and so many others. Having access to this data would be really helpful for users to increase their chances of catching fish by allowing them to analyze good conditions from previous successful catches and replicating these conditions. However, there aren't many tools that are currently available on the market that can provide users with this crucial information. FishQuest on the other hand, provides users with this information. When users log catches, the extra information provided for the catch will be available for all users on the platform to see so that they can access these successful conditions and have a better chance at catching fish.

6 RELATED WORK

There are currently relatively very few applications that use artificial intelligence or machine learning to assist users in recognizing the many fish species that they can fish for locally or globally. Additionally, there aren't many paid applications that assist us in identifying fish species that customers would be interested in. One illustration is Fish Angler, a program that advertises itself as being highly automated. Their approach has a problem since it is too limited in scope. The problem with how their application is implemented is that there is nothing like a favorites feature where a user can select which species are his or her favorites, which makes it very challenging for the user to identify fish species they enjoy fishing for. Fish Angler is a free and cross platform application but due to its limited options and lack of flexibility the application is different from ours [6]. ANGLR, Fishidy, and iAngler are a few more free and paid applications that use the principles of machine learning for different purposes, such as tracking the depth of the water and forecasting the weather. The application ANGLR takes a very similar approach to

our program Fish Quest, but it doesn't have any features that allow you to share your information with other users or allow them to follow your feeds, like they can on Instagram. Since there is nothing that users of ANGLR can find fascinating, this application is not recommended by other users. [2]. Fishidy is very similar to ours which basically means that it is a true fishing application that needs weather predictions, fish feeds, and assistance with following other users' feeds. Despite being a versatile app, this one is commercial and requires users to purchase things in order to access all of its features. [3]. Last but not least, iAngler is an application that was primarily created to increase users' interest in fishing. It features fish competitions, and those who were successful in catching a particular species or meeting the requirements for the competition received XPs or had a point system, which increased users' interest in fishing and earning points. But iAngler's only shortcoming is that it isn't a complete fishing program because it doesn't reveal which users have caught a certain fish or offer any kind of map feature that would allow users to see what species they would be interested in fishing for. Therefore, the main purpose of this application is to earn XPs or points; nothing else. [1] Our application, called Fish Quest, combines all of the aforementioned applications. It will have a Feed Page (like Instagram) [5] where users can follow and like each other's posts, a Map Page (like Snapchat) [4] where they can clearly see the various species, as well as XPs for daily and weekly streaks and favorites if a particular user is interested in a particular species of fish. Furthermore, this application is available for free and is a cross-platform application.

7 System Overview

The high level architecture of the app will be broken down into 3 components: the catch log, the social feed, and the achievement system. These three systems will co mingle and intertwine in multiple ways and form the FishQuest app. The core component of the app will be the catch log functionality, with the other 2 playing directly off the catch log. The catch log will allow users to input a photograph of their catch, along with some additional information to be determined later on, and log said catch in their account for other components to take from. There is also going to be an machine learning component alongside the catch log that will attempt to tell the user what type of fish they caught for additional data. This will, for the sake of a system structure, be mostly attached to the catch logger functionality. Along with these features the catch log will also feed data into a catch map of the local area so that people can see who is catching what sort of fish when and where, this is yet another add on to the catch log rather than its own proper feature. The function of the catch logger is the core of the app which both other functions will play off of, essentially acting as the source of all data within the app ecosystem. The account progression system will award players with experience towards levels and achievements which will save to their account. The social media feed will allow the sharing of accomplishments or fish catches with other people in the area and allow those users to like comment and share others' posts in order to help others or simply to congratulate on a nice catch. These three features will co-mingle amongst each other in multiple different ways other than just the ways described here, but for now that is the extent of the high level overview. From a user perspective a potential use of this app would be someone catches a fish then takes a picture and uploads it to their account. The app then tells the user what kind of fish it is, asks for some additional information and logs that data along with the location into the account. The catch is then uploaded to the catch map for other users to see. The user may then choose to post that catch on their social media feed to allow other users to comment and react. This catch is also counted towards any potential challenges or achievements that user may be working towards as well as granted experience towards the next user level.

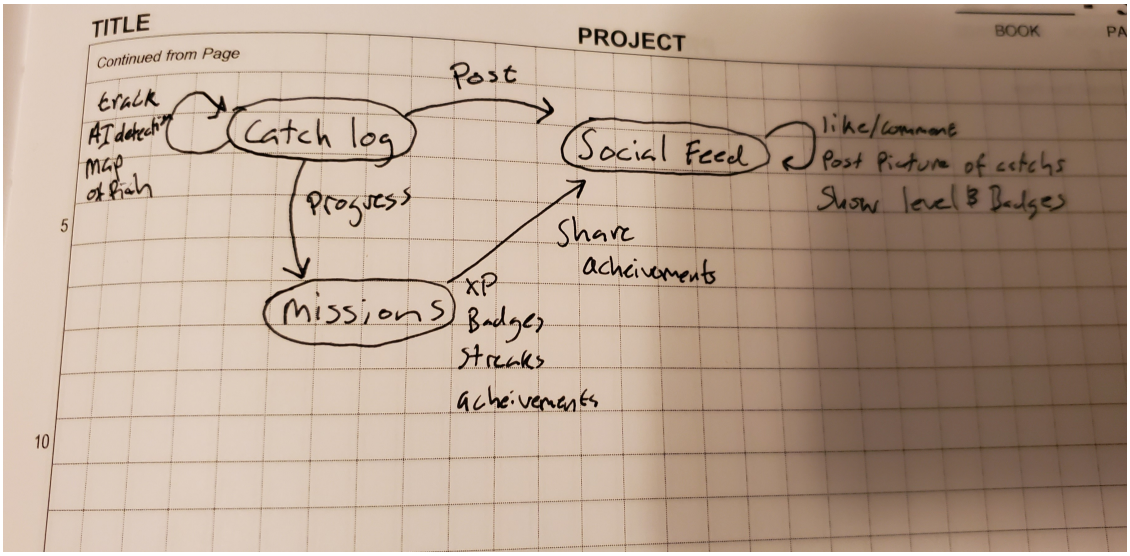


Figure 1: Drawing of system overview

8 Roles & Responsibilities

The stakeholders of this project are primarily our project sponsor and the team members themselves, although University of Texas at Arlington also has a stake in this project, their role is purely financial. Our sponsor for this project is our professor, Shawn Gieser. Dr. Gieser will also act as our general project advisor, our point of contact with the university, as well financial benefactor. The actual members of the group and their roles are as follow. Although these roles are assigned and defined, everyone will be helping everyone with anything that requires a bit of extra help. As of now we will all work together on the role of scrum master and product owner, as our general outlook for this team is everyone helps with everything they are able to. Brandon Stibich will be in charge of database operations including setting up and maintaining the database behind the app. Mohammed Zakiuddin will be primarily responsible for user interface and user experience design and implementation and other general front end work. William Sigala will focus mostly on the machine learning aspect of the project as well as any sort of back end work he is able to help with. Kevin Phan and Othman 'Dean' Kamel do not currently have primary roles due to this project being in its infancy, however their current role is to help with whatever they feel inclined to and to work on the stuff not defined in this section of the charter such as the leveling up system and the social feed.

9 Cost Proposal

Because of this project being solely a software one, our cost is zero.

9.1 Preliminary Budget

We were able to use a free tier of cloud service which was our only potential cost.

9.2 Current & Pending Support

The sole funding source for this project is the $800 that is provided to us as a group in senior design by the University of Texas at Arlington. We have no further sources of funding for this project as we don't have any outside sponsors.

Cost description	Cost proposal

10 Facilities & Equipment

This project is a purely software application which will not require physical equipment other than the personal devices the team already has. Since this will be a phone app for iOS and Android, the team will be using personal phones for software testing. For developing the app, the team we will be using personal computers. The team using personal devices for the project will allow for a swift initial start on development due to everyone's familiarity and personal preferences.

For early development, the Fish Quest team has decided to have in-person meetings for discussing and planning out each iteration for the project. This will facilitate the design process for early development. In-person meetings will be held in the lab space provided. For future development, the team plans on shifting from mainly in-person meetings to virtual meetings. The team will primarily be using Discord and Teams for communicating. GitHub will be used for version control and containing the source code. Other files and assets may be stored on a OneDrive to be shared with through Teams. Task assignment and tracking progression will be done with Trello. If something calls for an in-person meeting, then we may meet in the lab to address the matter. Figma will be used for designing the user interface for the application.

The project will require cloud services to manage and process the application data. The cloud service that has been selected for this project is Amazon Web Services. If their free service is insufficient, then we will consider upgrading and utilizing their paid services with the funding provided. Since there is some level of ambiguity surrounding the performance required for the application, the cost for upgrading cloud services is also unknown but should lie within our budget.

11 Assumptions

The following list contains critical assumptions related to the implementation and testing of the project.

- The application will be limited to fish species native to Texas
- There will be a large amount of fish images required for training the fish classifier
- The application will be used near bodies of water
- The application will require fake user data for development
- The application will require cellular service at the fishing location
- Team members will have individual roles but will not be limited to working in their designated area
- Team members will have to share a similar developer environment
- The application will be extended to other regions if time permits

12 Constraints

The following list contains key constraints related to the implementation and testing of the project.

- Final prototype demonstration must be completed by May, 2022
- Ensure the security and proper usage of user data
- The varying technologies required for constructing the project will require assigning specializations for each team member

- The technology demands a level of proficiency that will have to be procured during or prior to development for some team members
- Total development costs must not exceed $800
- Terms of use with the technologies being used to develop the application

13 Risks

The following high-level risk census contains identified project risks with the highest exposure. Mitigation strategies will be discussed in future planning sessions.

Risk description	Probability	Loss (days)	Exposure (days)
Gathering an insufficient amount of fish image to train a robust classifier	0.40	14	5.6
Delays due to team members getting sick or other complications	0.20	7	1.4
Resolving critical errors during software testing	0.50	8	4
Delays due to unfamiliarity of tools used in creating the application	0.50	18	9
Falling behind schedule due to a component depending on another component's completion	0.20	12	2.4

Table 1: Overview of highest exposure project risks

14 Documentation & Reporting

14.1 Major Documentation Deliverables

14.1.1 Project Charter

The Project Charter will be maintained and updated every sprint in the case of any changes that need to be recorded. The initial version will be delivered by the end of the first sprint on 09/26/2022. The final version will be delivered by end of the last sprint estimated on 04/28/2023.

14.1.2 System Requirements Specification

The System Requirements Specification document will be maintained and updated every sprint in the case of any needed changes or additions to the requirements. The initial version will be delivered by end of the second sprint on 10/17/2022. The final version will be delivered by the end of the last sprint estimated on 04/28/2023.

14.1.3 Architectural Design Specification

The Architectural Design Specification will be maintained and updated every sprint after it has been completed in the case of any subsystem changes. The initial version will be delivered by the end of the third sprint on 11/07/2022. The final version will be delivered by the end of the last sprint estimated on 04/28/2023.

14.1.4 Detailed Design Specification

The Detailed Design Specification will be maintained and updated every sprint after it has been completed in the case of any design changes. The initial version will be delivered by the end of the fourth sprint on 12/05/2022. The final version will be delivered by the end of the last sprint estimated on 04/28/2023.

14.2 Recurring Sprint Items

14.2.1 Product Backlog

Items will be added to the product backlog at the beginning of each sprint cycle. The items will be added and shared with the team members using the Trello project management web application. The items will be prioritized based on a group vote.

14.2.2 Sprint Planning

For each sprint cycle, there will be a meeting between all group members at the beginning to discuss the plan for the sprint. There will be 8 sprints in total.

14.2.3 Sprint Goal

The sprint goal will be decided by the team based on the customer's needs at the beginning of each sprint

14.2.4 Sprint Backlog

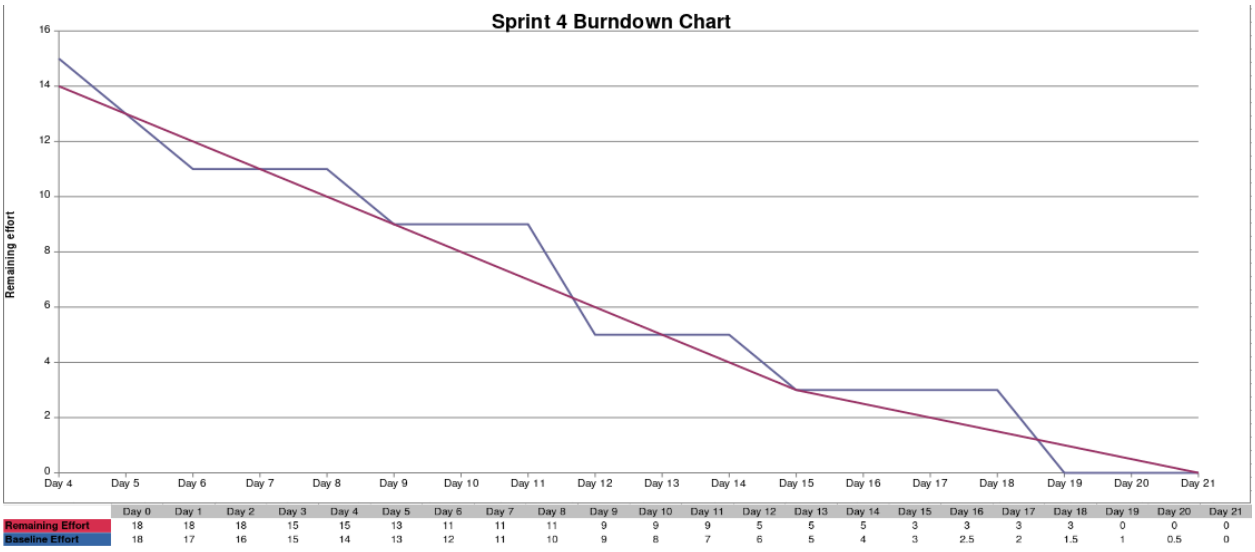
The team will decide which items make it into the sprint backlog based on reasonable time estimates for how long each task will take. The backlog will be maintained using Trello web application.

14.2.5 Task Breakdown

Each team member will volunteer to claim a task and if no one volunteers for a certain task, the task will be assigned based on the strengths of each team member. Time spent on tasks will be documented be each member using a separate channel on discord.

14.2.6 Sprint Burn Down Charts

The team will discuss and assign a different member to generate the burn down charts for each sprint. The member will be able to access the total amount of effort by each team member using the channel on discord who is accessible to everyone.



	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
Remaining Effort	18	18	18	15	15	13	11	11	11	9	9	9	5	5	5	3	3	3	3	0	0	0
Baseline Effort	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2.5	2	1.5	1	0.5	0

Figure 2: Sprint 4 burndown chart

14.2.7 Sprint Retrospective

The sprint retrospective will be discussed in a team meeting during the last day of the sprint. It will be documented in a slide and due 2 days after each sprint.

14.2.8 Individual Status Reports

Each member will submit an individual report to document their work after each sprint. The report will contain the sprint goal, backlog, individual time spent, team burndown chart, individual retrospective, and peer review.

14.2.9 Engineering Notebooks

Engineering notebooks will be updated after every meeting, and when any addition of designs or requirements are made be each team member. Each member will be responsible for updating their engineering notebooks.

14.3 Closeout Materials

14.3.1 System Prototype

The final system prototype will include every part of the application and it will be demonstrated using multiple diagrams. There will be a Prototype Acceptance Test (PAT) with our customer to ensure that everything is as requested.

14.3.2 Project Poster

The poster will include the vision, mission, Architectural design diagram, future plans, key requirements, and technologies used in our project. The poster will be delivered after the completion of the project estimated to be on 05/02/2023.

14.3.3 Web Page

The web page will include the team's name, timeline, team members, sponsor, abstract, background, project requirements, system overview, results, future work, and project documentation. The web page will be accessible to the public and will be delivered on 05/02/2023

14.3.4 Demo Video

The demo video will show every part of our application. The video is estimated to be 5 minutes long.

14.3.5 Source Code

The source code will be maintained using GitHub. Each team member will complete their task in a separate branch and then push it to GitHub. The source code will be provided to the customer at their request. The project will be in a private repository.

14.3.6 Source Code Documentation

The documentation will be simple and concise, and it will be kept up to date at all times. Any change to the code will be documented and every function will be explained. The documentation will be stored inside of a README file in the GitHub repository.

14.3.7 Installation Scripts

The installation of the application will be through the Android 'Play Store'

14.3.8 User Manual

The customer will be provided with a digital user manual that will help explain the features of the app for every new user registration.

REFERENCES

[1] Anglr. Angler labs inc.

[2] Snook Gamefish Foundation. Iangler.

[3] Brian Jensen. Fishidy.

[4] Evan Spiegel. Snapchat.

[5] Kevin Systrom. Instagram.

[6] Tom Wye. Fishangler.