COVID19 Case Report

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1 Introduction

There has been a serious world pandemic which was not foreseen during the studies of the project. This report explains how seriously the Felerest team has been affected by it, measures that will be taken to avoid getting infected by the Coronavirus, how the rest of the project's progress will be, where the team members currently are, their roles in working individually, the current status of the project, the tasks to be done and so on. The team member's currency of meetings, how these meetings will be held, how to overcome any limitations of video/audio conferencing will be mentioned to safely and productively continue developing this project for the purpose of serving our customers.

2 Team Members

1. **Location:** The team members are located in Ankara. While Asude, Utku and Eser are staying with their families, Furkan and Doga are staying with their house mates.

2. **Smart Phone:** Each member of the team has a smart phone.

3. **Video/Audio Conferencing:** Eser does not have a reliable connection which made it impossible to conduct a video conference on DSL internet. Mobile data usage for a video conference with 5 people is 230-350 KB/s depending on the streamed video which is approximately 850 MB for an hour. A typical conference (we had one to write the report and discuss other issues) lasts around 2 hours because of the connection issues and lack of eye contact. Therefore, a single meeting costs around 1700 MB which is impractical since mobile internet quota is 7 GB and costs 45 TL. Therefore, it is only possible to meet with a voice call and use the video conference utility only if there is a critical issue.

   Other team members can access internet without any trouble. Regarding this note, meetings are scheduled weekly with voice calls.

3 Current Status

3.1 Mechanics

The food reservoir and electronic devices are fixed on the wooden surface. This surface will be placed inside an outer box which has already been bought before the pandemic.

Currently, new design for the outer box was made using Siemens NX program and it is ready to be produced with correct material. In order to bring this design to life, we need to order Plexiglas from the internet and this Plexiglas should be cut via laser cutting by experts. This procedure requires too much human interaction. Therefore it will be done if the pandemic problem will be under

control in the future, allowing us to work as a group. Otherwise, we will use our old rubbish bin in order to provide a final product in the end.

3.2 Electronics

All components are placed on the board and connected properly. However, we suspect that there might be some anomalies on the board, and since the multimeter is in the laboratory locker, we are not able to check the components.

3.3 User Interface

Current implementation of the user interface displays cat profiles and device battery levels. Also, the names of the devices and cats can be changed by the user.

3.4 Computer Vision

Classification part was finished and tested during the first semester. Identification is finished but not tested. These two have not been put into work sequentially and not tested.

4 Remaining Tasks and Future Plans

Remaining tasks are given under 5 titles.

4.1 Mechanics

- 3D drawing will be modified.

- The errors of the current inner mechanical structure will be fixed.

- Plexiglas will be purchased and the box is assembled.

- Electronic components are settled and integration is completed.

4.2 Electronics

- The weight sensor will be calibrated.

- The implemented battery level readout circuit will be tested.

- All components will be rechecked.

- Any broken or otherwise dysfunctional components will be replaced.

4.3 User Interface

- Food level of the device will be displayed.

- Feeding logs of the cats will be provided.

- Communication with the Arduino and Raspberry Pi will be implemented.

- Database for the cats and devices will be initiated.

- Acceptance of identification subsystem outputs as this subsystem's inputs will be seamless (asynchronous, if possible).

4.4 Cat Identification

Identification code is written, however it is not integrated into the whole system. Software integration is nothing but coding, however, overall system testing is unavailable because of the pandemic. There are three things left :

- Optimization

- Integration

- Test

Unfortunately, these three all require access to hardware. Optimization requires more samples taken from the camera, integration needs all of the equipment to be connected and working at the same time, and test means overall system test. Also, a lot of data is required. Fortunately camera is in Eser's house who is responsible for the sample collection and identification. Under these conditions, if approved by the advisor, samples can be collected from a computer screen with different cat images since going outside is dangerous and no pets exist in Eser's house.

Tests can also be done in online data sets or from Facebook cat images; however, these data sets do not give any meaningful information because they are taken from many different cameras with very different properties which makes the feature descriptor algorithm perform poorly. Therefore, we propose that specific cat images displayed on a screen can be utilized to create the database.

5 Proposal of Course of Events

The uncertainty of the pandemic's future pushed us to consider three scenarios in which our interaction with each other and the outside world has various limits. The following were taken into acount: Pi camera is with Eser, most of the mechanical parts are in the capstone laboratory, and crucial parts of the mechanical and electronic systems are in Doga's house. The proposed scenarios follow:

1. Pandemic continues, old design with the rubbish bin is used, and all subsystems are completed individually.

2. Pandemic continues, all subsystems except the mechanics part is built.

3. Pandemic ends, all subsystems are connected and tested together.

We will explain these three scenarios further.

5.1 Old Mechanical System is Used

We had a design with a rubbish bin that was lacking some requirements. It was not waterproof. Ground clearance was unnecessarily high, making the system prone to getting knocked over by cats, dogs or people. This is the first way of completing our project (by using this flawed outer shell), without building more mechanical components.

It is still a problem that almost all of the mechanical and electronic components are in the capstone laboratory and the bin is in Eser's house, whereas the heart of the mechanical parts are at Doga's. Therefore, this strategy needs at least a meeting which we try to avoid because of the pandemic. However, deciding on the fact that we will finish the mechanics, it is a must to gather all of the electronic and mechanic parts.

This way does not require team members to purchase or go shopping to buy new products, but a single meeting. On the other hand, mechanical and electronics parts of the project have varied since this box was decided not to be used earlier in the progress. So, there is a chance this box may not fit due to these slight variations.

5.2 Mechanical System is Ignored

Another possibility is to ignore all of the mechanical systems and go on with the old measurements and improve and fix the remaining parts. However this idea does not allow us to conduct tests and see the overall system in work. By this way, simulations of the mechanical parts with the food mechanism, simulations of electronic parts, and software - computer vision - decision making part tests can be done separately. This is the best way to avoid the virus and keep ourselves safe during the pandemic; however, it is also an undesired case for us since it will throw all of the effort that we have made during the last 6 weeks on the mechanical parts including many efforts and various designs supported with mechanical implementations.

5.3 Pandemic Ends and Project is Completed

In case of the pandemic ending in a short time, which seems not probable with the current situation of the virus, our team can meet and complete the missing parts with the new mechanical design implemented. New design drawing for the Plexiglas is ready. Therefore, it will take around a week to complete and

test the project with all team members working. However, most probably there will be many exams just after the pandemic. Therefore, we request a week after the exams so that we can complete the project. Otherwise, it is not possible for us to carry out the project and the exams at the same time in such cramped conditions. In conclusion, it is still probable to hand in a full finished system if and only if at least a week's time is given where all team members have light schedules - meaning no school duties.

Aside from these 3 cases, the computer vision algorithms and web designs will be finished nevertheless. Normally the identification part belonged to Eser only, and web design belonged to Furkan only. During the isolation weeks identification will be shared among Eser and Utku, whereas web design will be shared between Furkan and Asude. Doga will be contacted if other needs arise regarding algorithms, since he has already designed the mechanics for the new system until now: he has completed his duties.

In result, Work distribution during Isolation:

- **Asude:** Web design Front-end.

- **Furkan:** Web design and Back-end.

- **Eser:** Identification and Software Design.

- **Doga:** Fixing electronic malfunctioning if possible and fixing the errors in 3D drawing if necessary.

- **Utku:** Help with Identification.

6   Conclusion

In this report the member's locations and their video/audio conferencing abilities have been discussed. More importantly, the current status of the project, which parts were finished, which are missing and testing that was done and is required was mentioned. The remaining tasks and the work distribution among the team members were thoroughly explained. The measures taken to prevent the Covid-19 virus spread and the limitations that occurred were discussed. In accordance with these limitations 3 possible solutions were proposed, and their advantages/disadvantages were evaluated.