

Final Presentation: The CoPilot app



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Volvo Construction Equipment



Our client is Volvo Construction Equipment.
They need an Android app to create and edit paths for their new autonomous machines to follow.

The CoPilot App



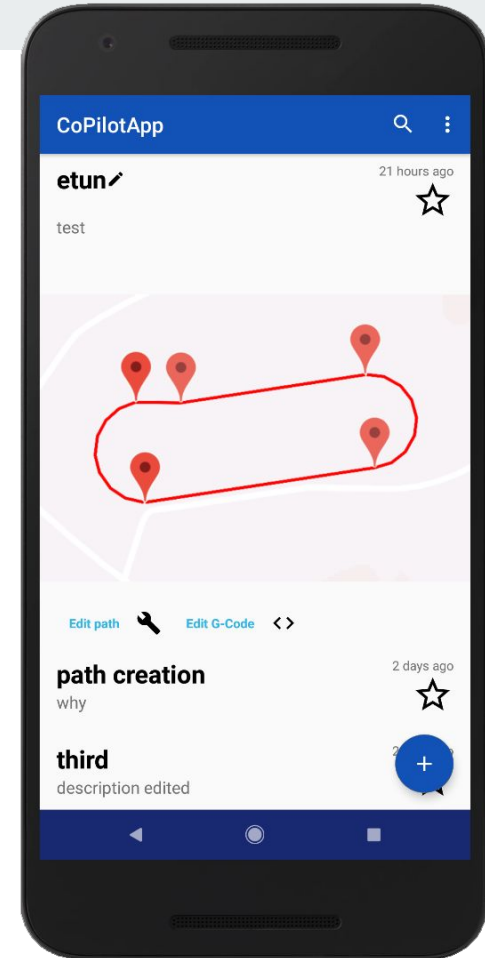
Firebase



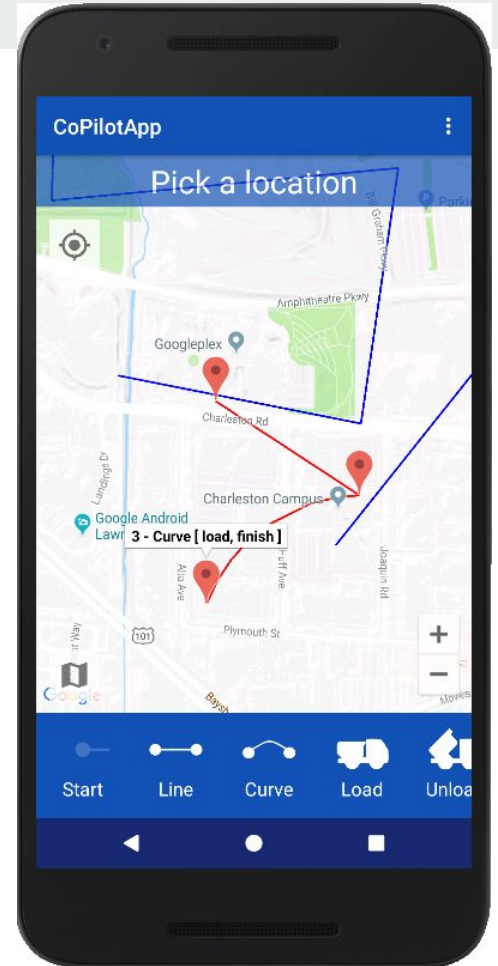
Maps

Features of the final product

- User authentication
- Login/Logout feature
- Database
- Paths' list display
- Creation of paths
- Edition of paths via visual interface
- Edition of paths via G-Code interface
- Deletion of paths
- Reservation of machines
- List filtering



- The paths need to have load, unload and wait states



Desired features that were not implemented

- Decision points for the path
- Not a flat-Earth (take inclination into account)
- A better location feature than GPS
- Automatic calculations of the load and unload maneuvers when a location is selected
- A simulator to run a path directly in the app
- Connection to the autonomous machines



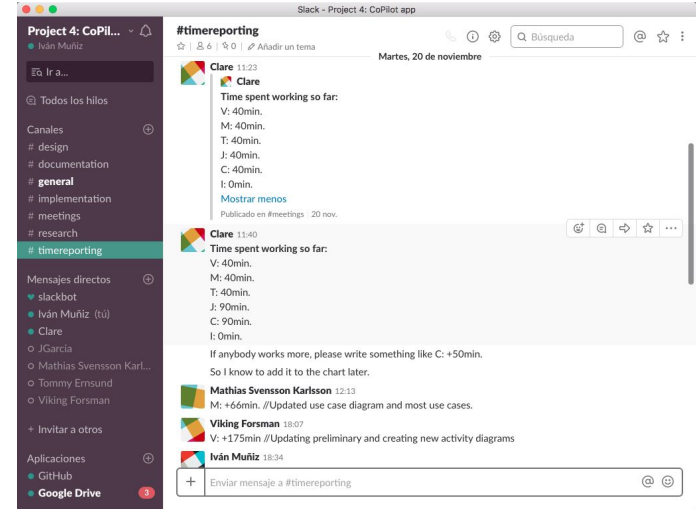
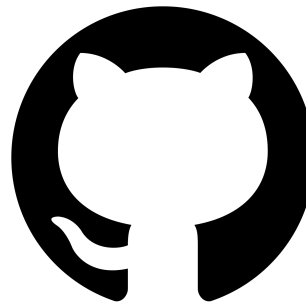
Suggested improvements for the future

- A connection with the autonomous machines
- More layout support
- Additional UI improvements
- A more reliable way to measure the location
 - Real time kinematic (RTK)
 - Network-RTK
 - Precise Point Positioning (PPP)



How did you work?

- Git for version control
- Slack for internal communication inside the development team
- Skype for Business for weekly communication with the client



Activity distribution

- The division and synchronization of work was accomplished by:
 - Internal meetings
 - The project board in the GitHub repository
- Everyone was involved in all activities at some extent
- Some activities were distributed based on prior knowledge



Did you follow the timeplan?

- We followed the time plan for the most part.
 - We turned in our documentation in time.
 - We were on track with everything we wanted to show the client and the steering group in our weekly meetings.
- There were, however, some exceptions:
 - Originally, our product was divided in three phases, that are now two.
 - Some features have not been implemented due to lack of time.



Routine changes

- Changed from in-person meetings to Discord meetings.
 - It was difficult to find suitable time and location for everybody.
 - This happened during the last two weeks of the course.
- Changed from meeting at least twice a week to meeting at least once:
 - This happened when the steering group's meetings ended.



The positive experiences

- It has been interesting to work for a client from the industry.
- We have liked learning how to organize and distribute work in a larger group.
- Also, learning practical skills with modern development.



LESSONS
LEARNED



What would we have done differently?

- We would have started reporting time from the beginning of the project, and not since the third steering meeting.
- We would have been more specific about the tasks that needed to get done and how were we going to tackle them.
- We would have thought about work distribution more in the initial phases of the project.

LESSONS
LEARNED



Concrete advice

- Be realistic when estimating work effort for project tasks.
- Be concrete about who does what, and write everything down.
- Meet several days a week, and always with a plan in hand for the meeting.
- Practice a lot before presentations.
- Book meeting rooms well in advance.





Thank you for your attention! Any questions?

