UML for Embedded Systems

Exam FALL 2015
Foscam fi9900p
Overview and Features

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http://soc.eurecom.fr/UMLEmb/

During an exam, you are not supposed to talk with someone else, by any means (including mobile phones, chat, etc.). Access to Internet is restricted to the website of the UMLEmb course only. You may consult your own UML/SysML models made in the scope of the labs, but not other models. Electronic devices are not allowed at all, apart from your computer ;-).

A grade is provided for each question. 1 bonus point is given for the writing part.

1 Objective

Your objective is to model the **software application embedded in a Foscam® webcam**. The specification of the system is available online[1], yet you are asked to only model what is provided in this document.

You have exactly 3 hours to model this system, and answer various questions: the time is very short. This means that **you have to take modeling assumptions**. **Keep your diagrams simple and readable**, in particular the analysis diagrams.

Your grade takes into account your report and your models. At the end of the exam, **reports** (in pdf format) and **models** (in TTool format) **must be sent to me by email**. Also, **the report must be printed** and **given to Alexia Cepero right after the end of the exam session**. The report should contain explanations concerning your models, as well as relevant screen captures of models (e.g., interesting simulation traces, formal verification results).

2 System specification

2.1 Description

Overview
The FI9900P combines a high-quality HD digital video camera with a powerful built-in web server to provide live video anywhere. All that's required is an internet connection and viewing device such as a smartphone or desktop computer. The "Plug and Play" setup process is easy: simply scan the camera's QR sticker with your smartphone and it syncs with the camera automatically. This IP camera comes equipped with 30 high powered IR LEDs for night vision up to 65ft.

Features

- *1080P (1920x1080) display resolution for crystal-clear video and images.*

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[1]http://foscam.us/products/foscam-fi9900p-outdoor-ip-camera-pnp.html

- *Super-Wide 106° Viewing Angle*

- *The FI9900P comes equipped with external RCA jacks for two-way audio.*

- *30 high powered IR LEDs provide you night vision range up to 65 feet.*

- *The FI9900P automatically detects moving objects and can trigger various alarms. Get an email sent to you. Protect your loved ones easily and effectively.*

3 Assignments

I. Assumptions

1. Your assumptions should be clear. Do list them in the report: that list might evolve according to the models you will make afterwards. [2 points]

II. Requirements

1. Create a requirement diagram. [3 points]

III. Analysis

1. Make a use case diagram. [3 points]

2. Continue the analysis in the form you want: activity diagrams, nominal scenario, error scenarios, ...: you are free to use the diagrams you want. Of course, the idea here is to show important points of the specification. [3 points]

IV. Design and validation

1. Make a block diagram. Put the emphasis on which blocks are used to model the system to design, and which ones are used either to model the environment, or to prove properties (observers). [3 points]

2. Draw state machines, and provide a nominal simulation trace, as well as an error trace. [3 points]

3. Prove that when an alert is triggered, one of the following cases applies: (i) an email is sent, (ii) the Internet connection is down, (iii) destination emails haven't been registered. Also, from requirements, pick up a property of your choice, and prove whether it is satisfied (or not!). And obviously, explain how you have modeled those properties [3 points]

Good luck, have fun!