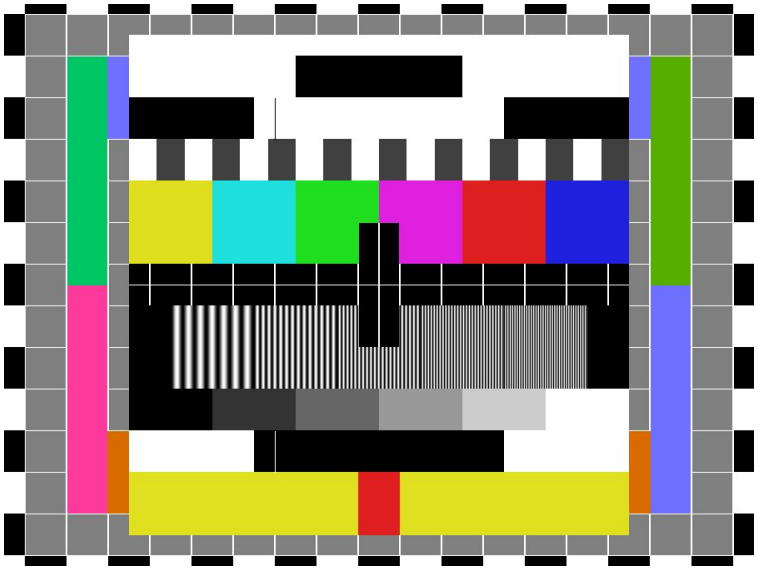
Department of Computer Science & Engineering
University of Texas at Arlington

System Requirements Specification
CSE 4316: Senior Design I
Fall 2017



Team Tassium
MasterChef

Anthony Tatowicz
Jesse Daniel Mitchell
Todd Brewer
Linh Vu

Revision History

Revision	Date	Author(s)	Description
0.1	10.27.2017	LV	First draft of contents 7,8,9

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1 Product Concept

The application of the UR5 known as MasterChef is designed to reduce the cost of owning a business oriented around preparing food. With the increase in demand towards a higher minimum wage, many businesses will be seeking options to save money.

1.1 Purpose and Use

MasterChef will be able to prepare food (specifically hamburgers) to serve to a consumer. You will be able to queue up requests and receive the food.

1.2 Intended Audience

The target audience for MasterChef are restaurant owners (more specifically ones that run chain restaurants), as MasterChef will allow them to save money on hiring workers.

This will allow owners to save money, worry less about payroll taxes, and serve quality food at a lower cost.

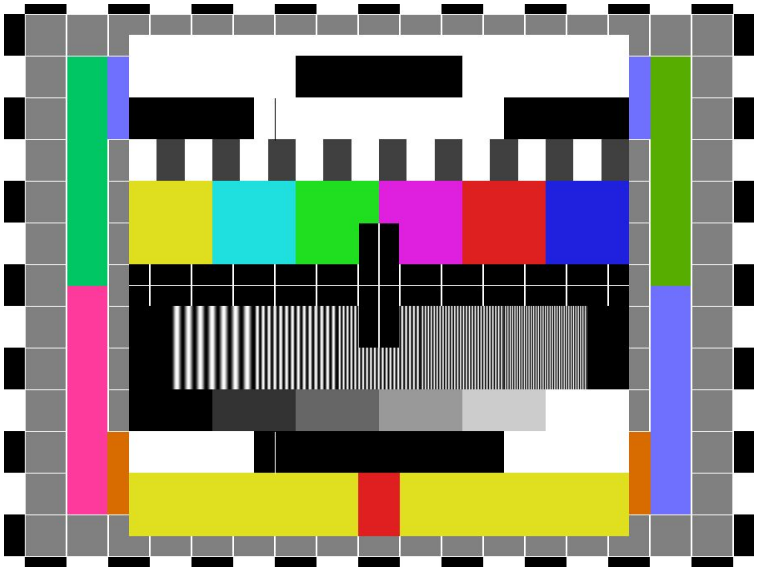

Figure 1: X conceptual drawing

2 Product Description

"This section provides the reader with an overview of X. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces are described in detail." Using words, and pictures or graphics where possible, specify the following:

2.1 Features & Functions

This product will cook hamburgers on the grill using vision processing, 3D Printed Mounts, and the UR5 Robotic Arm. You will be able to queue up jobs for the MasterChef for it to know when to start cooking.

It will specifically have a webcam, and various 3D Printed attachments. External equipment may also be designed to make it more convenient for the robot to finish preparing the burger.

2.2 External Inputs & Outputs

The product will receive basic instructions from a cashier, and also use a webcam to process where hamburger patties are.

This webcam will allow it to instruct the webcam to pick up patties and move it onto the grill. Once it is done grilling, it will move it to a "finished" zone, and display a message that the hamburger is done.

Describe critical external data flows. What does your product require/expect to receive from end users or external systems (inputs), and what is expected to be created by your product for consumption by end users or external systems (outputs)? In other words, specify here all data/information to flow into and out of your systems. A table works best here, with rows for each critical data element, and columns for name, description and use.

2.3 Product Interfaces

There will be a user interface designed to make it easy to queue up different hamburgers with assorted requirements (like if this burger have ketchup added on top).

Aside from that, the product will be fairly autonomous.

3 Customer Requirements

It is important for the user to perform a risk assessment when using this product. Refer to the UR5 user manual for additional detailed specifications and requirements of the product's hardware.

3.1 Workspace Assessment

3.1.1 Description

The UR5 must be used in a workspace within a radius of 850mm of the base. For all required functions, the tools and and attachments can only be used within this space. The UR5 has a maximum payload of 11 pounds so keep that in mind when assigning tasks.

3.1.2 Source

UR5 Team (Team Tassium), UR5 Manual

3.1.3 Constraints

N/A

3.1.4 Standards

N/A

3.1.5 Priority

High

3.2 Tool and Attachment Bindings

3.2.1 Description

Any tool or removable attachment secured to the mount of the UR5 must go through a safety check to ensure that the tool is secured and will not move within the mount while in use. This is to ensure the integrity and safety of the system.

3.2.2 Source

UR5 Team (Team Tassium)

3.2.3 Constraints

N/A

3.2.4 Standards

N/A

3.2.5 Priority

High

4 Packaging Requirements

Product is handled as is. No additional packaging protocol or concerns are needed for this product.

4.1 Packaging

4.1.1 Description

Handled as is.

4.1.2 Source

UR5 Team (Team Tassium)

4.1.3 Constraints

N/A

4.1.4 Standards

N/A

4.1.5 Priority

Low

5 Performance Requirements

MasterChef is a technology based on the UR5 platform developed to cook food.

5.1 Requirement Name

5.1.1 Description

5.1.2 Source

Source
- Put Research info here
- Any Websites

5.1.3 Constraints

- How much work space do we need to aim for?
- How is the throughput required? patties/hr?
- Human interaction constraints and safety?
- Reliability?
- Cost?
- Productivity goals?

5.1.4 Standards

- Health/Safety standards

5.1.5 Priority

- Health/Safety
- Cost
- Productivity increase
- Other constraint

5.2 Requirement Name

5.2.1 Description

5.2.2 Source

Source
- Put Research info here
- Any Websites

5.2.3 Constraints

- How much work space do we need to aim for?
- How is the throughput required? patties/hr?
- Human interaction constraints and safety?
- Reliability?
- Cost?
- Productivity goals?

5.2.4 Standards

- Health/Safety standards

5.2.5 PRIORITY

- Health/Safety
- Cost
- Productivity increase
- Other constraint

6 Safety Requirements

Include a header paragraph specific to your product here. Safety requirements might address items specific to your product such as: no exposure to toxic chemicals; lack of sharp edges that could harm a user; no breakable glass in the enclosure; no direct eye exposure to infrared/laser beams; packaging/grounding of electrical connections to avoid shock; etc.

6.1 Requirement Name

6.1.1 Description

Detailed requirement description...

6.1.2 Source

Source

6.1.3 Constraints

Detailed description of applicable constraints...

6.1.4 Standards

List of applicable standards

6.1.5 Priority

Priority

7 Maintenance & Support Requirements

The user of the product will be responsible for maintaining the product by troubleshooting with the manuals. If it is a hardware failures, the customer should contact the manufacturer(UR5). Any such requirement will be describe here in this section in details.

7.1 Requirement Name

Tools Maintenance
Software updates
User manual/support

7.1.1 Description

To be describe in the future

7.1.2 Source

Linh Vu

7.1.3 Constraints

None at this time

7.1.4 Standards

None at this time

7.1.5 Priority

Tools Maintenance: Moderate
Software updates : Moderate
User manual/support: Moderate

8 Other Requirements

Items and tools that will be use in the final product will be describe here in this requirement section.

8.1 Requirement Name

Tool rack setup
Camera placement
UI

8.1.1 Description

Tool rack setup : Placement of the tool rack will be place at a specified position of the UR5.
Camera placement : Placement of a camera will be facing the UR5 at an angle and height for maximum visual.
UI : User interface that will allow the user to change the task of the UR5.

8.1.2 Source

Linh Vu

8.1.3 Constraints

Placement of the tool rack will be place at a specified position of UR5.

8.1.4 Standards

To be specified later.

8.1.5 Priority

Tool rack setup : Low
Camera placement : Low
UI : Low

9 Future Items

All priority 5 in the previous section will be describe here in this section.

9.1 Requirement Name

9.1.1 Description

Detailed requirement description...

9.1.2 Source

Source

9.1.3 Constraints

Detailed description of applicable constraints...

9.1.4 Standards

List of applicable standards

9.1.5 Priority

Priority

REFERENCES