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# Visualizing Smart Home Data Through User-Friendly Graphs



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## Introduction

The CASAS Smart Home is a helpful tool when it comes to caring for the elderly. The Smart Home retrieves a wide variety of information from the senior citizen, ranging from sleep time, to medication intake, to eating habits. This information is tracked using a complex system of motion trackers, weight sensors, and heat sensors spread throughout the home. On a typical day, hundreds of these sensors are fired off and logged by our computers. With the WORRDS Project, it is our job to take this information and display it to users in an easy and accessible format, mainly through visual elements.

Our graphs will be tailored to each user depending on whether the user is a nurse, a family member, or an administrator of the senior citizen (this group is often referred to as the Circle of Care). Nurses, for instance, prefer to see information in a longer timeline (such as by month or by year) to determine patterns in the senior citizen's habits. Family members on the other hand, would rather see just the most recent couple of days. Due to the vast amount of information being retrieved from the Smart Homes, we selected graphs that best display the data, while still maintaining a simple and easy to read format.

## Objectives

- Update old graphs to be more comprehensible
- Determine the best models to present data to older users
- Convert sensor data to visual models

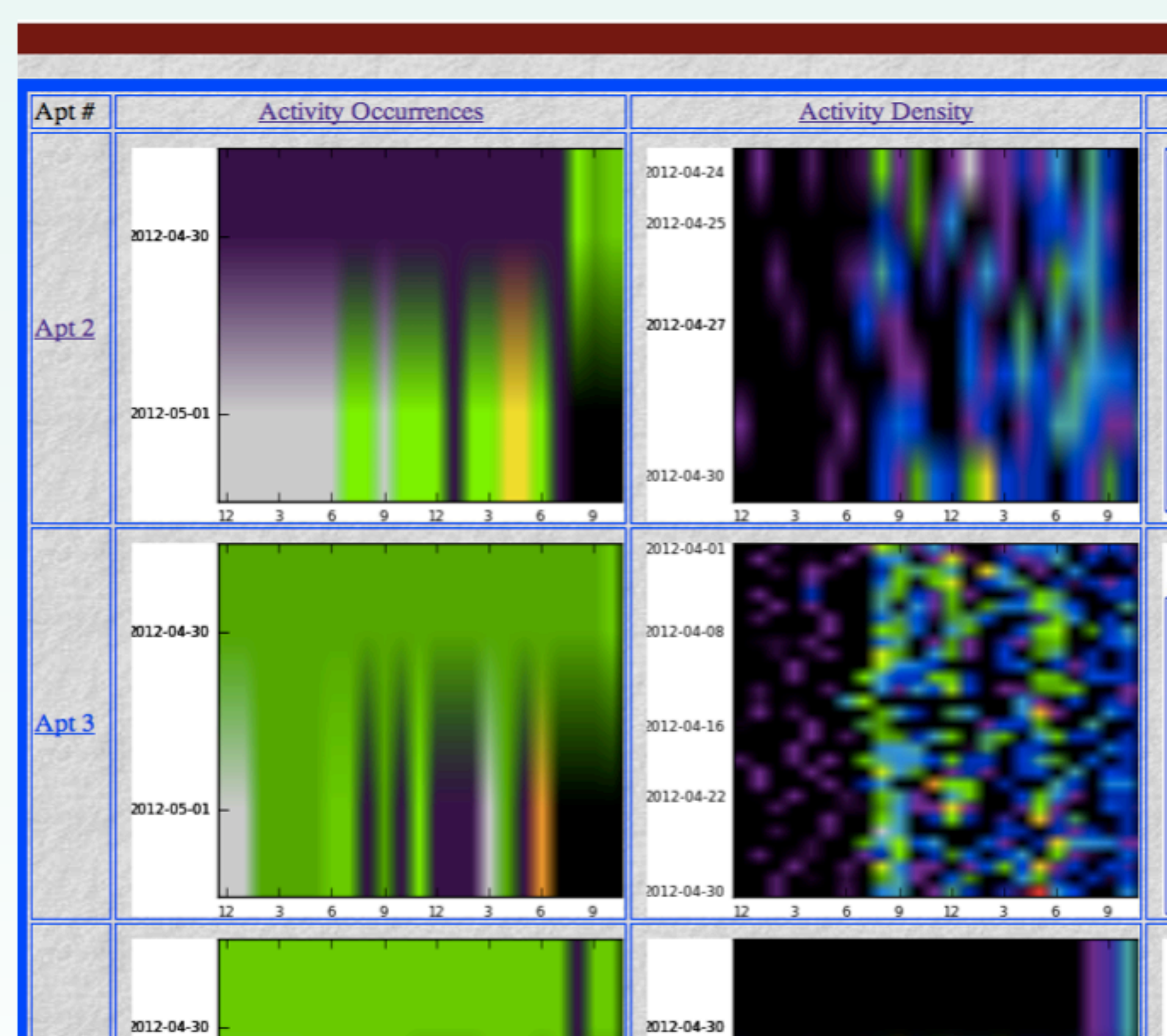


Figure 1: Activity Density Map

The figure shows how the data was displayed in the past. The model shows every sensors' firings over 3 months.

## Results

### Quotes from users who tested our website

"It's very simple. It's a usable format. This was much more user-friendly"

"It seems like something a health care facility would be interested in"

"At a glance, you're going to know what's going on"

### Conclusion

Based on the feedback from our testing, we concluded that the newer models were simpler and more user-friendly than the older models. The test subject were pleased with how easy the newer models were when it came to presenting information. After the testing, only minor fixes were requested from the subjects, which showed that there were no major flaws in the way we presented the data. We proceeded to incorporate these requests so that we could improve the effectiveness of the models. One such suggestion was that the users requested a legend for the sleep graph since they were unsure about the colors. Figure 1 shows what we did to comply with this request.

### Future Work

Although we finished the three basic layouts for our graphs, these graphs are only directed towards family members of the senior in the smart home. Different styling of the same graph will be needed for nurses, administrators, and the user themselves. Also, we will need to create an intricate username/password for people in every part of the circle of care. A challenge in this would be allowing users to assume different roles for different circles of care, all while having the same username and password. Our hope is that we can implement these features so that they can assist users who possess a smart home in a box (SHiB).

### Acknowledgments

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### References:

Zulas, A. Leah. "Caregiver Needs from Elder Care Assistive Smart Homes: Nursing Assessment." (n.d.): n. pag. NursingNeeds. Web. 26 July 2016

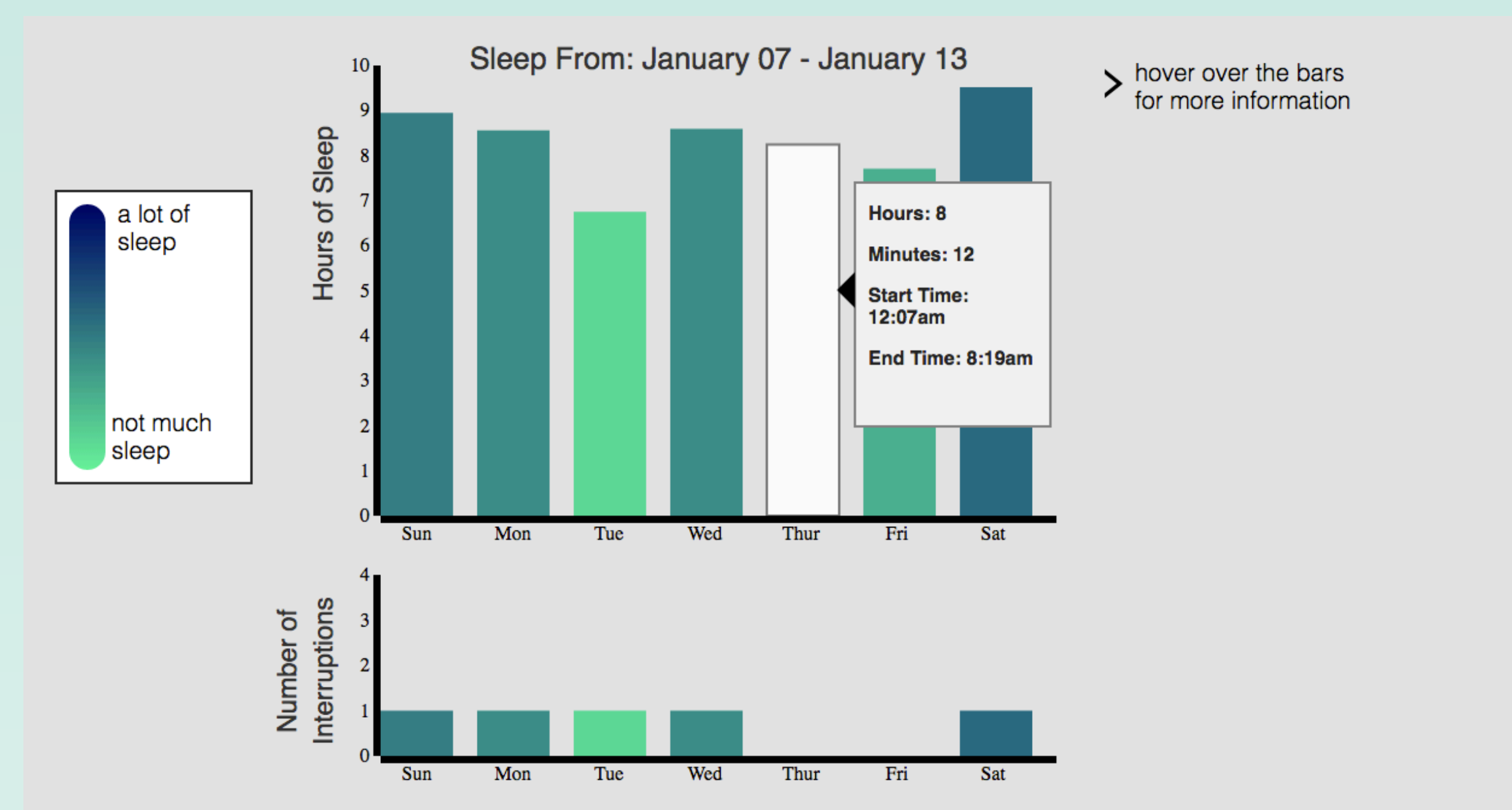


Figure 2: Sleep Schedule For Patient

The figure shows the number of hours the patient has slept, the number of interruptions while they slept, and the duration of the interruptions.

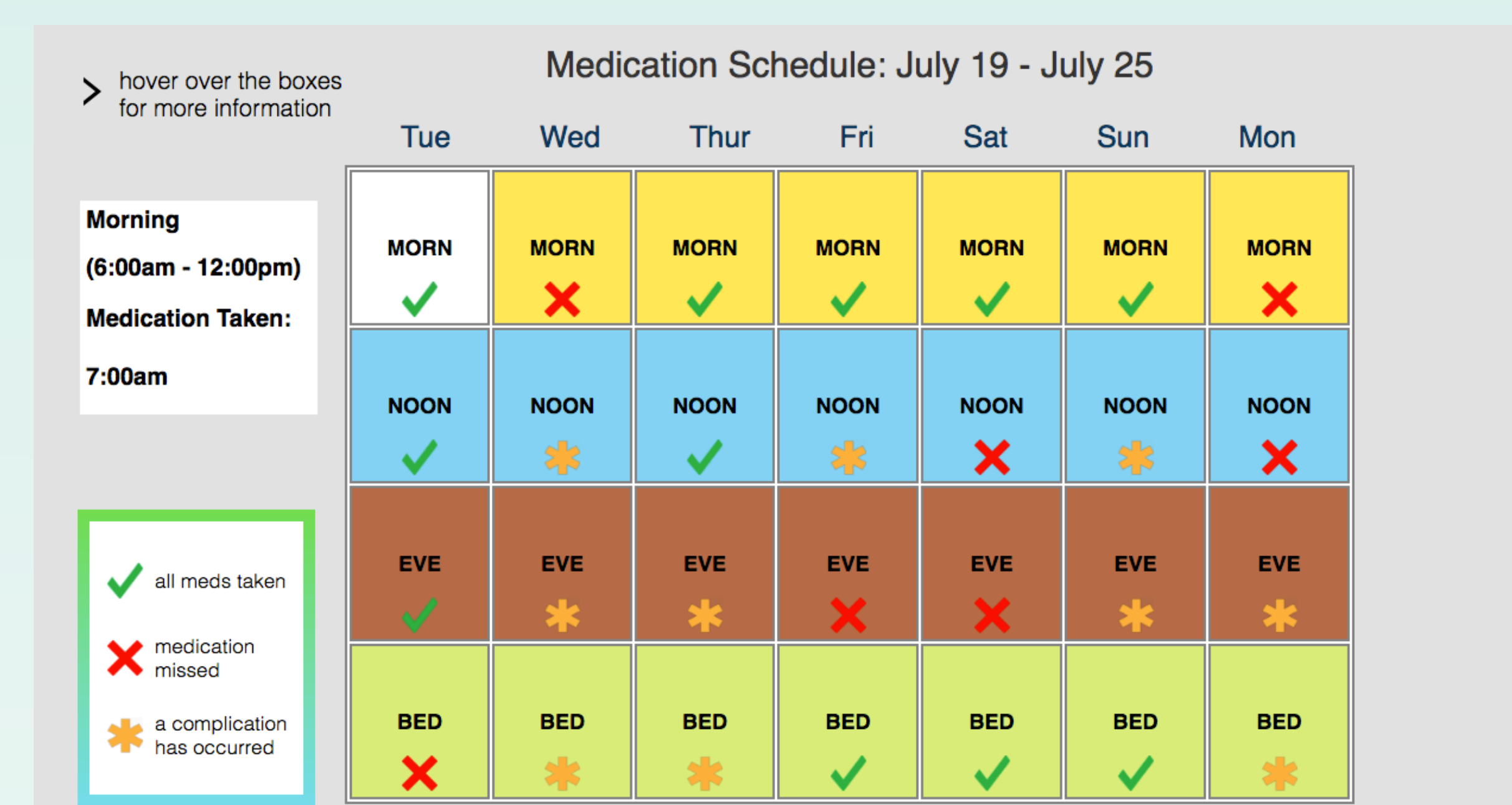


Figure 3: Medication Schedule For Patient

The figure shows the patient's medication schedule for the last 7 days. It will notify the user whether the patient properly took the medication or if there was an error.

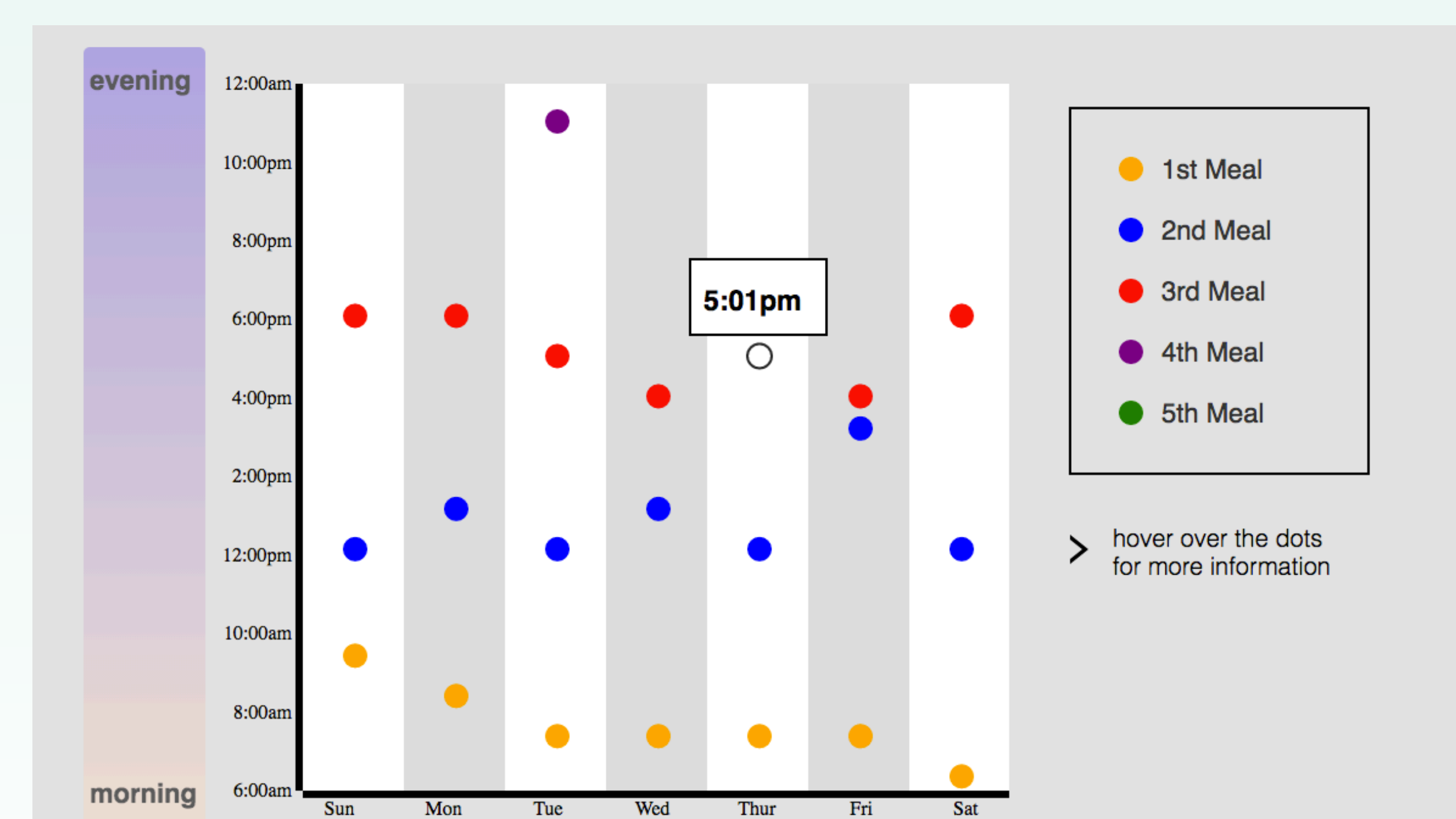


Figure 4: Eating Schedule For Patient

The figure shows the patient's eating habits throughout the week. This model shows the number of times the patient has eaten and when the patient has had the meal.