1. **<u>Incorrect margins</u>**
   - Margins must be 1.5 inches on left and top, and 1 inch on right and bottom.

   - Common issues with margins are:
     - o Margins that are much too large, especially the top.

     - o A right margin that is nonexistent. The text bleeds off the page.

     - o Bottom margin is too small or nonexistent. The text covers the page number.

spamming *Storm botnet* [24, 50] controlled upwards of twenty million computers and gained enough computational capability (in instructions per second) to rival a supercomputer [52]. In March 2010, Microsoft obtained a restraining order to take down the servers of the Waledac botnet, which infected hundreds of thousands of computers and was capable of sending between 1 and 2 billion spam messages per day [54]

Entelecheia works by leveraging the characteristics that the P2P bots exhibit during what we call their Waiting Stage: (a) the tendency to send "keep-alive" messages to their other peers to let the botmasters know of their status and (b) the tendency to have overlapping peers due to their bootstrapping processes. Our approach produces a median F1 score of 91.8%, in a very challenging setting: (a) no signatures available, (b) no initial seeding information, (c) P2P botnets, and (d) during the Waiting stage.

The second work (detailed in Chapter 4) is focused on the the task of protecting the cyber security of an organization, which has grown increasingly more important as hackers constantly find ways to infiltrate organizations to steal valuable information. There are two common methods with which malicious entities seek to accomplish this objective, and both begin with guiding the users to websites under the control of the hackers. In the first method, the websites would either deceive the users into installing some malware into their computers or quietly execute the installation without the users knowing. In the second method, called "phishing", the users would see a (fake) website which looks legitimate and asks for the users' credentials to continue (think the login page of the organization's webmail system).

We seek to address the problem by asking a key question: *"Can we detect when*

```matlab
aL=length(-.999:preC:.999);


Dold = inf;

Dmin = 1 +

    (q*b^2*(1+a^2-2*a*rho+sigmaQ2*(1+a^2))+2*q^2*b^2*c*(-a*sigmaQ2+((1+a^2)*rho-a*

    ...

    - 2*q*b*(1-a*rho)/(1-rho*(q*c+(1-q)*d));

while Dmin/Dold <STOP


    %%% iterate c & d


    Dold = Dmin;

    c = -.999:preC:.999; cc=repmat(c,aL,1);

    d = -.999:preC:.999; d=d'; dd=repmat(d,1,aL);

    D = 1 + (q*b^2*(1+a^2-2*a*rho+sigmaQ2*(1+a^2))...

        +

            2*q^2*b^2*cc.*(-a*sigmaQ2+((1+a^2)*rho-a*(1+rho^2))./(1-rho*(q*cc+(1-q)

            ...

        - 2*q*b*(1-a*rho)./(1-rho*(q*cc+(1-q)*dd));

    [Dmin,i] = min(min(D)); [Dmin,j] = min(min(D'));


    c = cc(j,i); d=dd(j,i);


    %%% iterate a & b
```

Algorithm 2 Hybrid MSCKF/SLAM

Propagation: Propagate the state vect

readings.

Update: Once camera measurements become available:

- Augment the state vector with the latest camera pose.

- For features to be processed in the MSCKF (feature tracks of length smaller than m), do the following

  - For each feature to be processed, calculate the residual and Jacobian in (2.19).

  - Perform the Mahalanobis gating test in (2.20).

  - Using all features that passed the gating test, form the residual vector and the Jacobian matrix in (2.22).

- For features that are included in the state vector, compute the residuals and measurement Jacobian matrices, and form the residual $\tilde{\mathbf{z}}_k$ and matrix $\mathbf{H}_k$ in (3.2).

- Update the state vector and covariance matrix, via (3.4)-(3.7).

- Initialize features tracked in all m images of the sliding window via (3.8)-(3.10).

State Management:

- Remove SLAM features that are no longer tracked, and change the anchor pose for SLAM features anchored at the oldest poses.

- Remove the oldest IMU pose from the state. If no feature is currently tracked for more than m_o poses (with $m_o < m - 1$), remove the oldest $m - m_o$ poses.

CHAPTER 3 VISUAL AND

A. Contributions

The contributions of this Chapter are: 1) A contextual disease model based on Bayesian networks to estimate the spatial location of mTBI abnormalities. It allows for a range of contextual inputs, when the exact value (time or approximate location) is not known, which could be due to patient's memory loss. This contextual model helps to overcome the low contrast appearance of mTBI by focusing on the region of the search space that may have injury. 2) A visual model that is learned using texture features to build a probabilistic support vector machine (PSVM). The method does not require registration (it is spatially invariant), which can cause distortion. 3) A novel dataset of rat MR images is developed to follow mTBI to test the validity of the proposed model. The rat controlled cortical impact (CCI) mTBI model is used with multiple observations post-injury using T2 MRI maps to demonstrate the results. This paper is an extension of [36]. It extends the approach to repeated TBI and a more in-depth analysis of the contextual inputs is given.

B. Technical Approach

1. System Overview and Technical Rationale

The proposed system is a combination of a visual and contextual model. Figure 2 shows the system diagram. A database of known mTBI MRI brain and lesion volumes with manually detected lesions and the associated contexts is used to build the model. The visual model uses 3D texture features to build a Probabilistic Support Vector

2. **<u>Incorrect page number placement</u>**
   - Page numbers should be centered between the bottom line of text and the bottom of the page. About ½ inch from the edge.

   - Common Issues with page number placement:

        o The page numbers are placed too high on the page.

        o Page number touching the text.

them with r_8': **on** *ExtLgtLow* **if** *lSlp*=0 **do set** (*int*

do set (*intLgt*, 0); resulting in model PN_{fc}. Check

that the number of bad states decreases from 72,644 to 24,

that the remaining problem is related to rules r_2 and r_3. After chan

if (($lgtsTmr \geq 1$ **and** $lgtsTmr \leq 359$) **and** $lMtn = 0$) **do increase** ($lgtsTmr$, 1), the model passes

the check. This demonstrates the effectiveness of counterexamples to help a designer debug a set

of ECA rules.

We then turn our attention to larger models, which extend our original model by intro-ducing four additional rules and increasing variable ranges. In PN_1 and PN_2, the external light variable *ExtLgt* ranges in $[0, 20]$ instead of $[0, 10]$; for PN_4, it ranges in $[0, 50]$. PN_2 also extends the range of the light timer variable $lgtTmr$ to $[0, 720]$; PN_3 to $[0, 3600]$. We observe that, when verifying termination or confluence, the time and memory consumption tends to increase as the model grows; also, our symbolic algorithm scales much better than the best explicit approach when verifying confluence. For the relatively small state space of PN_t, enumeration is effective, since computing TC is quite computationally expensive. However, as the state space grows, enumerating the unstable states consumes excessive resources. We also observe that the supposedly improved explicit confluence algorithm sometimes makes things worse. The reason may lie in the fact that a random selection of a state from the frontier has different statistical properties than for the orig-inal explicit approach, and also in the fact that operation caches save many intermediate results. However, both explicit algorithms run out of memory on PN_3 and PN_4. Comparing the results for PN_3 and PN_4, we also observe that larger state spaces might require fewer resources. With symbolic encodings, this might happen because the corresponding MDD is more regular than the one for a smaller state space.
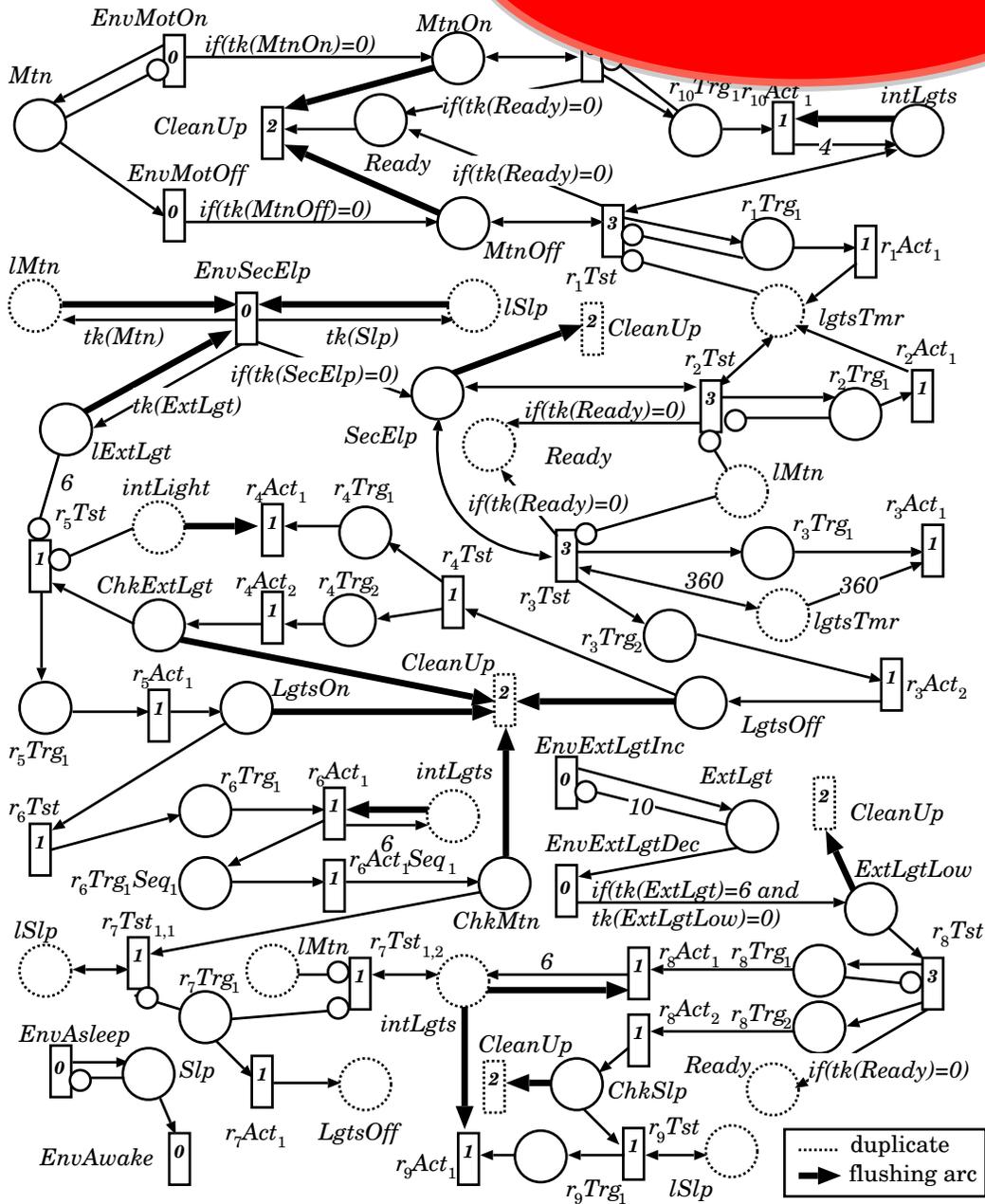
Figure 3.13: The PN for ECA rules in Figure 2.6.

3.5.1 Transforming a set of ECA rules into a PN

We now explain the procedure to transform a set of ECA rules into a PN.

First, we put each ECA rule into a regular form where both events and condition are

CHAPTER 3 VISUAL AND CONTE[...]

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3. <u>Incorrect pagination</u>
- The document is required to have three different sections of pagination.

  - Title/Copyright/Signature = no page numbers

  - Preliminary Pages (after signature page) = lower case roman numerals beginning with iv

  - Document = page numbers beginning with 1

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Spectroscopy of Photovoltaic Materials: Charge-Transfer Complexes and
Titanium Dioxide

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Chemistry

by

Robert J. Dillon

June 2013

Dissertation Committee:
    Dr. Christopher J. Bardeen, Chairperson
    Dr. Ludwig Bartels
    Dr. David Bocian

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Chapter 1

Introduction

In order to investigate the characteristics, performance metrics, and to understand the physical phenomenon behind the electronic behavior of field-effect transistors with novel channel materials, such as thin films of the transition metal dichalcogenide tantalum diselenide ($TaSe_2$), device fabrication and characterization were undertaken in this work. In Sec. 1.1, a brief introduction to the motivation behind radiation-hard materials for use in electronics and the device demonstrations achieved to meet the demand for radiation-hardness. In Sec. 1.2, an introduction to the proposed materials and material structure to complement silicon based devices. In Sec. 1.3, the need for low-noise devices is reviewed. In Sec. 1.4, the issues and challenges associated with device fabrication and characterization of FETs with $TaSe_2$ thin film channels is discussed. Finally, in Sec. 1.5, the outline of this dissertation is presented.

1.1 Radiation-hard All-metallic Logic Circuits

As motivation, scientists and engineers are continuing efforts to increase radiation hardness of electronic components. Sources of damaging ionizing radiation come from cosmic rays, x-rays, gamma rays and even alpha particle emission from radioactive contaminants of chip

4. <u>Widow lines and Orphan headers</u>

- There must be at least two lines of text at the top and bottom of each page.

- Pay particular attention to orphan headers = headers alone at the bottom of the page.

The temperature of the s[ystem] [...]

that a state in occupied;

$$P(\lambda, \ldots$$

. The electric current is calculated using the same [...] case, but including the probabilities $P(\lambda_1, \beta), P(\lambda_2, \beta)$.

$$I(t) = P(\lambda_1, \beta) \int_{p_0}^{p_f} \langle \psi_1(t)| \frac{dH}{dA} |\psi_1(t)\rangle + P(\lambda_2, \beta) \int_{p_0}^{p_f} \langle \psi_2(t)| \frac{dH}{dA} |\psi_2(t)\rangle \tag{4.71}$$

The third calculation used the density matrix formed from the wavefunctions ψ_1, ψ_2. The time evolution of the density matrix was found from solving,

$$\dot{\rho(t)} = -i[H, \rho]$$
$$\rho(0) = \sum_n P(\lambda_n, \beta)|\psi_n(0)\rangle\langle\psi_n(0)|. \tag{4.72}$$

Using the density matrix and the current operator $M = \frac{dH}{dA}$, the current element is the average of the operator (M):

$$i_p(t) = \frac{Tr[\rho M]}{Tr[\rho]}, \tag{4.73}$$

and the total current is found by summing over all momentum values,

$$I(t) = \sum_p i_p(t) \tag{4.74}$$

At extremely high temperatures, the probability functions $P(\lambda_1, \beta), P(\lambda_2, \beta)$ approach 1 and 0, respectively. The total current found from each of the three methods should be the same. The mathematica code written does show this.

At lower temperatures, the total current from the second and third methods should be identical. However, the mathematica code does not show this.

4.7 Open driven system: Linblad equation

4.8 Conclusions

INCORRECT – header with no text beneath it.

expressed in High Five cells and showed th[...]

receptor (Zhang et al., 2005). In contrast, APN was [...]

triggering membrane insertion and pore formation (Bravo et al., 2004; Jurat-Fuentes and

Adang, 2004). Therefore, I tested whether *Aedes* cadherin could mediated Cry11Aa

toxicity without a secondary receptor.

Aim 1.1: Determine if *Aedes* cadherin mediates the cytotoxicity of Cry11Aa with cell line expressing *Aedes* cadherin.

Hypothesis 2: N-cadherin protein may be involved in Cry11Aa toxicity.

As mentioned above, Bti action may involve more than one mechanism or one

receptor. To find more functional receptors of Bti toxins, I further investigate all cadherin

proteins that are in the *Aedes* genome. Based on previous research and our microarray

data, I found the N-cadherins (AAEL000597 and AAEL001196) were significantly

altered in Cry11Aa-treated larvae midgut. Therefore, I investigated whether N-cadherin is

involved in Cry11Aa toxicity. I first tested whether N-cadherins bind Cry11Aa and N-

cadherin-silenced larvae obtain tolerance to Cry11Aa toxicity. Moreover, I investigated

which regions are interacted between Cry11Aa and N-cadherin.

Aim 2.1: Test whether Cry11Aa binds to N-cadherin since Cry11Aa binds to normal cadherin proteins.

5. **<u>No spaces between references and list entries</u>**

- References should be single spaced with a blank line between each.

- The List of Figures and List of Tables must have a blank line between each entry.

INCORRECT – there must be a blank line (double space) between each reference

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CORRECT – blank line between each reference

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6. Co-Chairpersons on dissertation committee

- Example of "Chairperson"

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Computational Methods for Mild Traumatic Brain Injury

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Electrical Engineering

by

Anthony Christopher Bianchi

December 2014

Dissertation Committee:
      Dr. Bir Bhanu, Chairperson
      Dr. Andre Obenaus
      Dr. Hyle Park

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UNIVERSITY OF CALIFORNIA
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Pathophysiology of Juvenile Traumatic Brain Injury:
Role of Edema and a Potential Treatment

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Neuroscience

by

Arash Matthew Adami

August 2013

Dissertation Committee:
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