KDD-99

8/16/1999

Integrating Data Mining into Vertical Solutions: Problems and Challenges

Panel organizers

Ronny Kohavi
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Blue Martini Software
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Mehran Sahami
Systems Scientist
E.piphany, Inc.
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Panel Participants

- Jim Bozik from Acxiom Corp (data provider)
- Dorian Pyle from Data Miners (consulting)
- Rob Gerritsen from Exclusive Ore (consulting)
- Steve Belcher from Unica (horizontal to vertical)
- Ken Ono from Angoss (horizontal)

Panel Format

Panel is 90 minutes

☞ Introduction - 10 minutes	10
☞ Panelists: 1 minute intro by Mehran/Ronny 5 minutes opening statement	40
☞ Discussion: 30 minutes	70
☞ Panelists: 3 minutes closing statement	85
☞ Concluding remarks	90

Panelist Questions

- Eight questions were sent to panelists for opinions and interest rating
- Waterfall model based on responses:
  - Each panelist was asked to address two different questions
  - Each question is being answered by two consecutive panelists
  - Questions were chosen so that consecutive panelists do not agree on answer

Questions (I of II)

Q1: Solutions versus Tools What should companies sell?	Jim
Q2: Who are the users of the data mining? Business users or analysts?	Jim Dorian
Q3: Will data mining functionality be successfully integrated into databases?	Dorian Rob
Q4: Do models need to be interpretable?	Rob Steve

Questions (II of II)

Q5: Is there a future for horizontal data mining tool providers? Steve Ken

Q6: Will industry-standard APIs be adopted? Will they help horizontal data mining companies? Ken

Ronny Kohavi (Blue Martini Software)

- Joined Blue Martini Software in Sept 1998
  - Director of Data Mining
- Previous experience
  - MineSet manager, SGI
  - MLC++ project, Stanford University
  - Co-chair (with Jim Gray) of KDD-99's industrial track
  - Co-editor (with Foster Provost) of upcoming issue of the Data Mining and Knowledge Discovery journal special issue on:
E-commerce and Data Mining
- Ph.D. in Computer Science from Stanford

Mehran Sahami (E.piphany)

- Joined E.piphany in 1998
  - Systems Scientist leading data mining R & D
  - Manager of Real-Time Products development
- Previous experience
  - DM research at Xerox PARC, SRI, and Microsoft
  - Consultant in text mining/classification/clustering
  - Lecturer at Stanford University
- Ph.D. in Computer Science from Stanford

Jim Bozik (Acxiom)

- Joined Acxiom in 1997
  - Works directly with data mining clients
  - Leads effort researching analytical software
- Previous experience
  - Retail Marketing and Analysis at Signet Bank
  - Business Research Division at Hallmark Cards
  - Statistical Research Division at the U.S. Census
- BA in Mathematics and CS, MA in Statistics

Q1: Solutions versus Tools: what should companies sell?

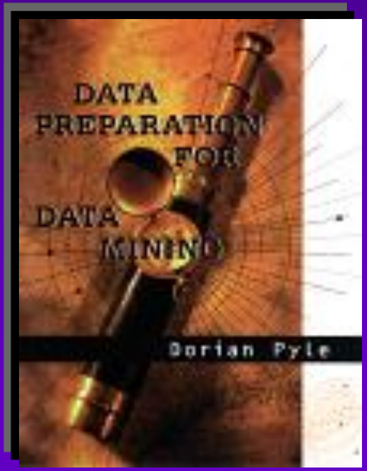
- We are interested in SOLVING PROBLEMS, not in BUYING SOFTWARE.
- SDS has an ongoing process of evaluating software that…
  - Enhances the ‘Analyst Toolkit’
  - Offers ways to create a more visually dynamic product
- We offer the following advice. It sounds like common sense, but you’d be surprised…
  - LISTEN! Ask about the areas of application, users, objectives (e.g., Don’t talk about NN if NN have limited use)
  - Provide explicit guidance on the proper configuration, and file size constraints for evaluation software

Q2: Who are the users of the data mining? Business users or analysts?

- In our environment, the users are ANALYSTS.
- We believe the issue is not the SCIENCE of analysis, but the ART of analysis.
  - Is the data received what you expected?
  - How do you spot problems in data? Are they really problems?
  - When do you create variables to enhance a model? Which ones?
  - How do you create a model that is intuitively appealing to a client?

Dorian Pyle (Data Miners)

- Joined Data Miners in 1998
  - Consultancy company with Michael Berry and Gordon Linoff
- Previous experience
  - 25 years of modeling experience, including at Naviant and Thinking Machines Corporation
  - Author of Data Preparation for Data Mining
  - Upcoming textbook Mining for Models



The Questions

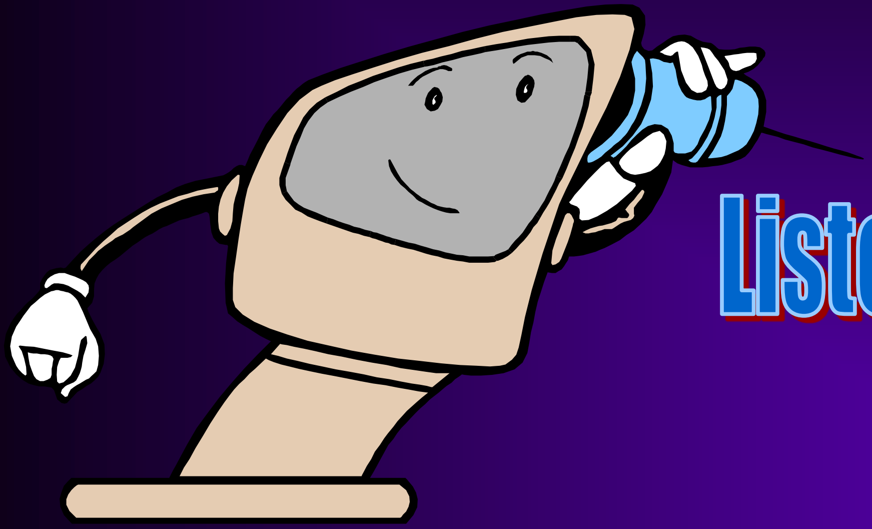
- Who uses data mining?
- Will data mining functionality be successfully integrated into databases?

The Problem

I really hate this damn computer,
I think I ought to sell it.
It never does just what I want,
But only what I tell it!

Sign in computer room. Circa 1975.

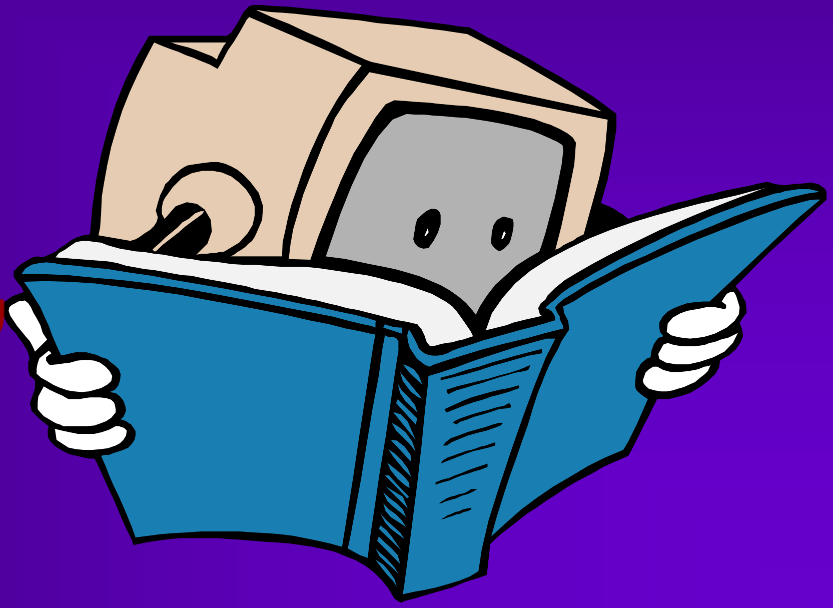
The ideal!



Listen to what we ask ....

.... do what we want,

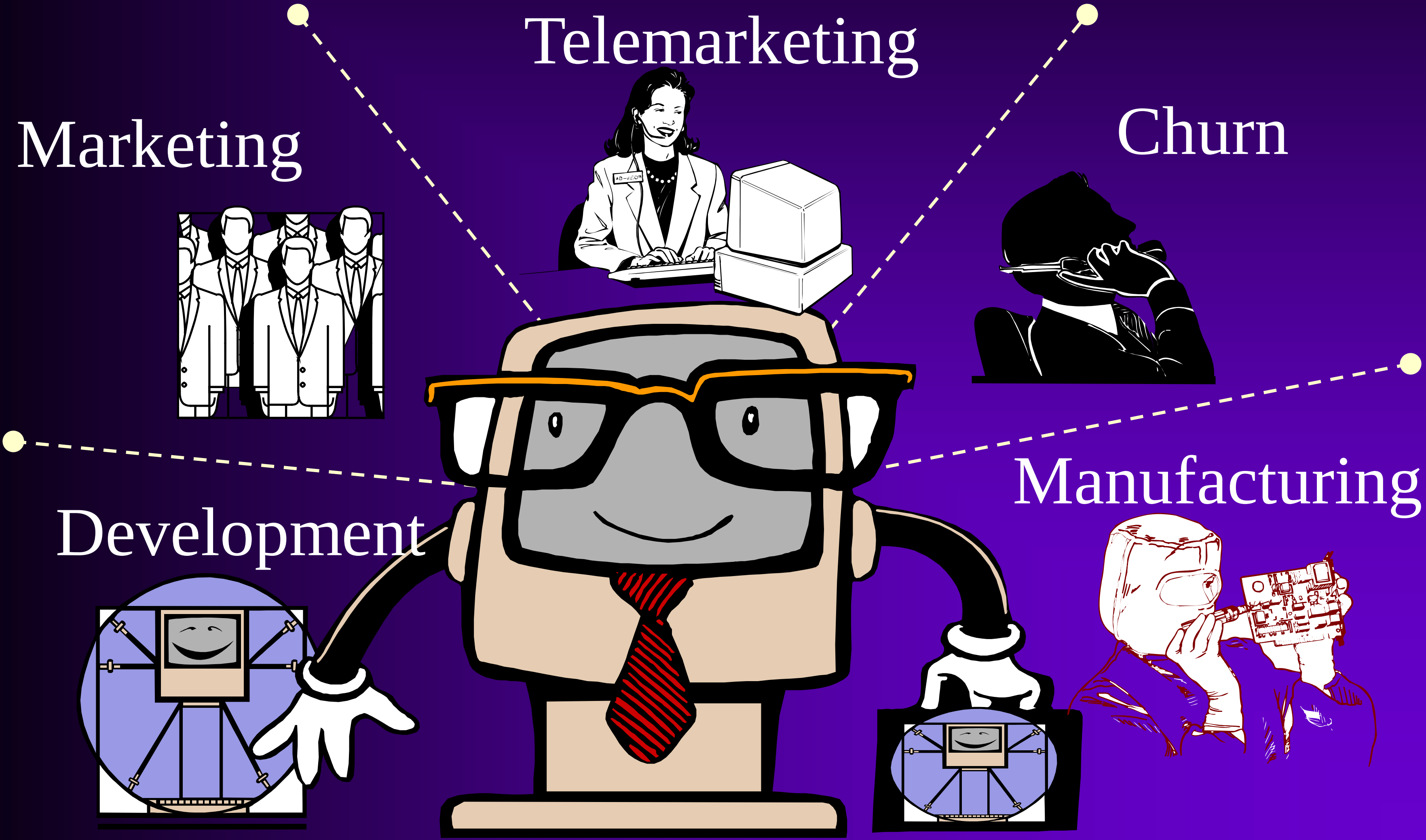
NOT what we said!



The Perception

Now this is magic!
It’s going to solve all my problems

The Way Today



Telemarketing

Marketing

Churn

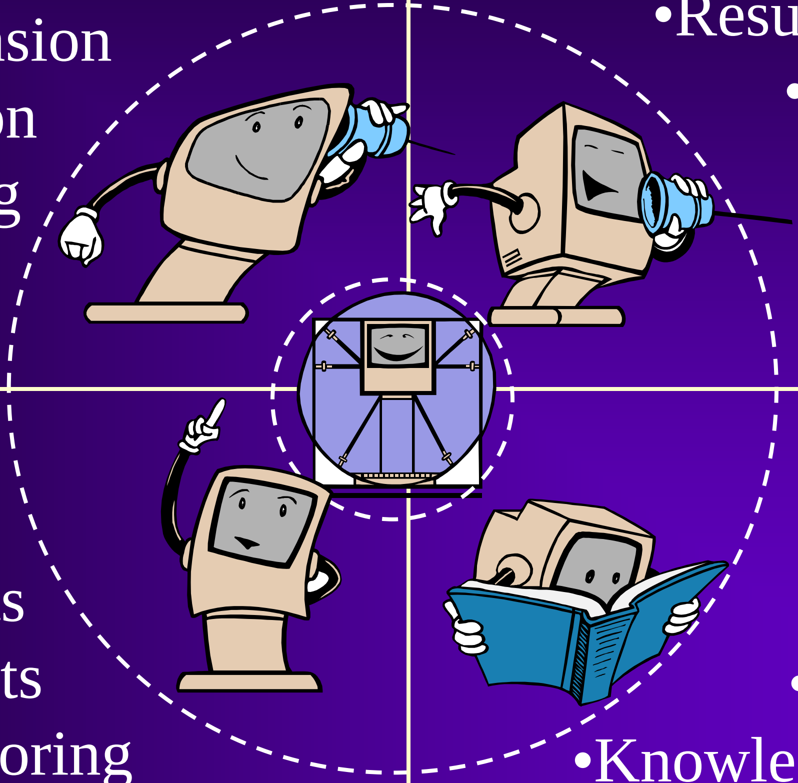
Manufacturing

Development

Tomorrow - A core technology

- Task comprehension
- Voice recognition
- Problem framing

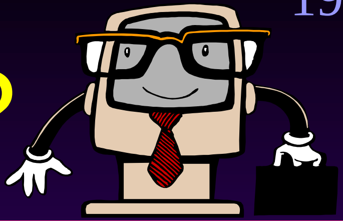
- Results presentation
- Mobile contact
- Web alert



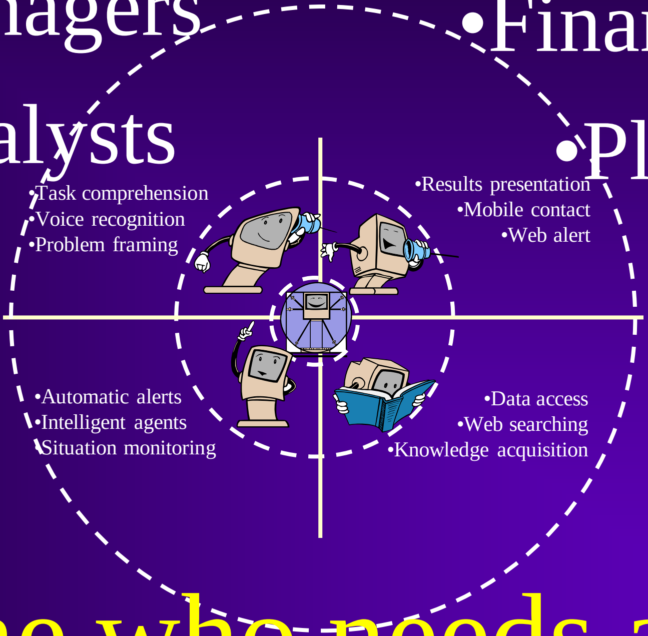
- Automatic alerts
- Intelligent agents
- Situation monitoring

- Data access
- Web searching
- Knowledge acquisition

Q: Who uses Data Mining?



- Business Managers
- Business Analysts
- Architects
- Planners



- Task comprehension
- Voice recognition
- Problem framing

- Results presentation
- Mobile contact
- Web alert

- Automatic alerts
- Intelligent agents
- Situation monitoring

- Data access
- Web searching
- Knowledge acquisition

- Financial Analysts
- Plant Managers
- Marketers
- Investors

A: Anyone who needs answers to questions based on available data

(No imagination about how needed!)

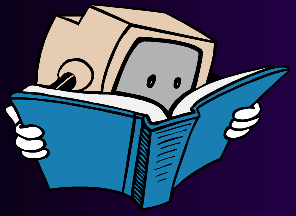
Q:Incorporate in Databases?

•Data access
•Web searching
•Knowledge acquisition

A: No - for business reasons …..

- First, the range of data to be accessed is not just in a database
- Second, the questions asked require multiple methods of inquiry - no “one-size-fits-all”
- Third, performance and currency (for now)

Q:Incorporate in Databases?



A: No - for technical reasons.

- Not just NN & DT. No common primitives for new techniques (evolution programming, algebra evolvers, swarm clusters, semantic nets, Baysian nets, thematic association, …..)

Rob Gerritsen (Exclusive Ore)

- Founded Exclusive Ore in 1997
  - Focus on data mining consulting and technology
  - Research in integrating data mining and RDBMS
- Previous experience
  - 31+ years experience in data management/mining
  - Co-founder and VP Technology at Two Crows
  - Associate Professor at The Wharton School
- Ph.D. in System Science from CMU

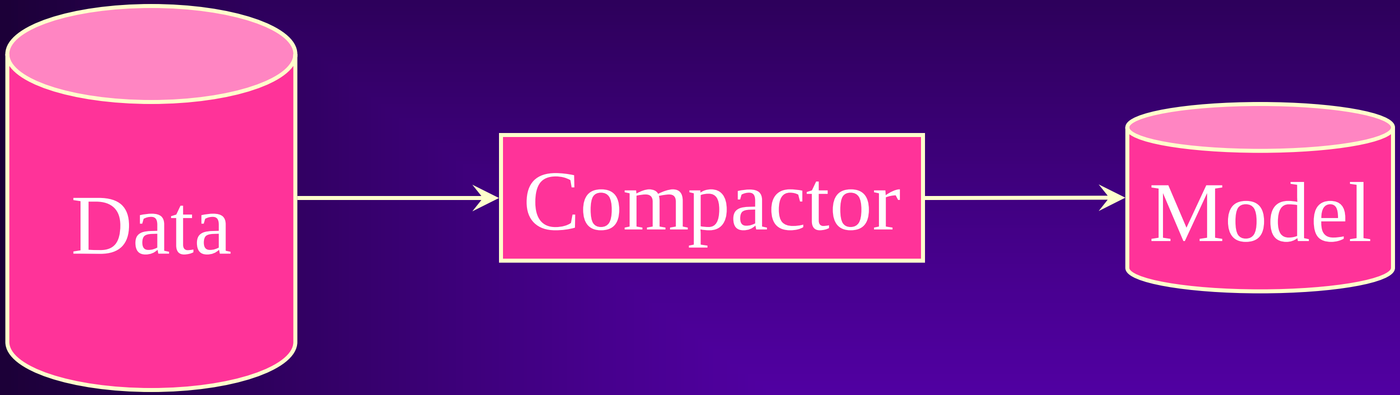
The Questions

- Q3: Will data mining functionality be successfully integrated into databases?
- Q4: Do models need to be interpretable?

Q3: DM into Databases?

- YES!
  - It's natural
    - – Models are no more than abstracted/reformatted data
    - – Data mining can benefit from database integration
  - It's inevitable
    - – Competitive pressure

DM Naturally Extends DBMS



- A model is an abstraction of the data and belongs with the data
- There is nothing more in a model than what is already in the data

DM Will Benefit from DBMS - I

- Model management
  - Version control, model comparisons
- Model deployment
  - Predictions right in the database
- Understanding the model
  - Browse, query, compare rules
- Incremental modeling
  - Revise models when new data arrives

DM Will Benefit from DBMS -II

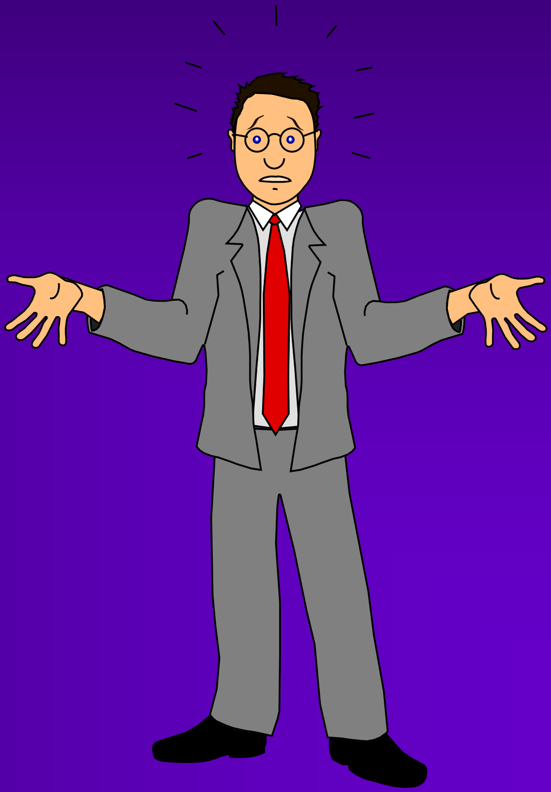
- Model monitoring
  - Continuous validation of models on new data
- Security services
  - Extraction opens big security hole!
- Better performance

DM into Database - Inevitable

- Expand the database as an enterprise platform
- Happening now
  - Informix/Red Brick SQL Extensions
  - Compaq SQL/MX
  - Oracle acquires Darwin

Q4: Models be Interpretable?

- YES!
  - For the model builder
    - – Avoid costly/stupid mistakes
  - For the business user
    - – “Trust me it works”



Business Risks are Too Great

- Direct mail
  - Would you eliminate 25% of your list without knowing why? You risk reducing revenue by 25%!
- Medical
  - Patient complains of recurrent headaches, but model says no brain cancer risk. Do you want to know why?
- Lender
  - Would you deny lending me $50K without telling me why?

Steve Belcher (Unica Technologies)

- Consultant at Unica Technologies
- Previous experience
  - Worked in IT and Data Mining for 16 years
  - Taught in graduate and undergraduate programs at several colleges
- Dissertation on application of neural networks in financial forecasting

Q4: Do models need to be interpretable?

- Models need to work. This does imply validation

- Interpretability is subject to customer needs

- Required in some applications - Fair Lending practices

Q5: Is there a future for horizontal data mining tool providers?

- Unique perspective
- A very limited future
- Vendor consolidation.
- Vertical apps are easier to use
- Models must be able to be used in a business environment
- DM Futures - embedded systems

Ken Ono (Angoss)

- VP of Technology at Angoss
  - Head of development for data mining solutions
  - Chief architect for the data mining product suite
- Other responsibilities at Angoss
  - Embedding technologies
  - OEMing technology
  - Other licensing transactions with partners

ANGOSS Products

- Provider of KnowledgeSEEKER & KnowledgeSTUDIO
- STUDIO designed from ground up to achieve:
  - Programmability and embedability (DCOM/ActiveX)
  - Tight integration with database (In-Place Mining)
  - Visualization and exploration for visual data mining and knowledge discovery
  - Ease of use
- Price points that make it much easier to start data mining

Q5:Future for horizontal DM tool providers?

- OEM - One of many approaches
  - Data Mining is a complex technology that can apply to many different industries
  - State of software industry makes it easy to encapsulate DM components
  - Why should solution providers have to learn intricacies of DM algorithms?
  - Can hide & automate complexities by leveraging domain knowledge thus widen market
- Analytic Market - small but important
  - Will continue to grow
  - Expert individual can created better models than an application that hides & automates process

Q5:Future for horizontal DM tool providers?

- Creation of predictive models (algorithms) will be incorporated into databases and will be become commodities quickly dropping in price
  - Microsoft OLE DB for DM & Oracle’s purchase of Darwin are the beginning of this
- DM Vendors must leverage & enhance functionality of database
- Client side tools are still required for data exploration and discovery of new and interesting insights

Q6: Will standard APIs be adopted, will they help horizontal DM corp.?

- Standards are already starting to emerge
- OLE DB for DM from Microsoft
  - Provides an easy way to create and deploy predictive models
  - Legions of developers can integrate DM with much less risk than writing to “one company API”.
  - Paves way for wide deployment of low risk PM’s.
    - “What banner do I display?” = low risk.
    - “Should I give this person a loan?” = high risk
  - Creates infrastructure for deployment of models

Q6: Will standard APIs be adopted, will they help horizontal DM corp.?

- PMML - another piece of the puzzle
  - Predictive Model Mark Up Language
  - XML extension for describing the contents of a predictive model
  - Defines a way for a PM to be
    - transferred between environments
    - persisted in a repository
    - searched and queried (find me a model that …)

Q6: Will standard APIs be adopted, will they help horizontal DM corp.?

- Will it help DM vendors?
  - ↗ Will reduce cost of ownership of adopting and providing solutions that contain DM
  - ↗ Will increase level of awareness about data mining (especially OLE DB for DM)
  - ↗ Will increase demand for data mining
  - ↗ Will increase competition