Peter Chen
Entity-Relationship Model

Peter Pin-Shan Chen is Taiwanese American Computer Scientist. He is a distinguished Career Scientist renowned with the development of the '*Entity-Relationship (ER) model*', one of the most influential discoveries in Computer Science and essential parts of Software Engineering.

Early Life & Education

Chen was born in Taichung, Taiwan in 1947. He attended the National Taiwan University, graduating with a B.S. in Electrical Engineering in 1968. Peter Chen further continued his education, receiving a Ph.D. in Computer Science/Applied Mathematics in 1973 from '*Harvard University'*.

Career

Peter Chen has undoubtedly spent the majority of his career taking up academia roles. However, he spent one summer working for '*IBM'* in 1970 followed by taking up roles in companies such as '*Honeywell'* and '*Digital Equipment Corporation'*. It was while working as an Assistant Professor at '*MIT Sloan School*' between the years 1974 and 1978 that he published his most famous paper "*The Entity-Relationship Model - Toward a Unified View of Data".* Chen has also taken up several other roles in Universities such as '*UCLA'*, '*LSU'*, '*Harvard*' and '*MIT'*. He is currently a faculty member at '*Carnegie Mellon University*'.

Work & Impact

When first deciding on the appropriate approach to designing an ER model, Chen decided to try and design a model that people would be able to use, understand properly and actually cared and worried about. Therefore, Chen wanted to solve the problems of the people.

In order to design a system like this, Chen decided to simplify the model in which people could familiarise themselves with. Every day, people are surrounded by both entities and relationships everywhere we go, in people's offices, schools and homes. For example, in an interview room, there's a video camera, people and chairs. People sit on the chairs and face the camera, so automatically there is a relationship between the people, camera and chairs. To Chen, this is why it made perfect sense to use entities and relationships to order information as it was at its most basic level, the natural way people processed and organised information.

In addition to Chen's design, it can equally be related to Fred Brook's famous paper "*No Silver Bullet – Essence and Accident in Software Engineering",* particularly in respect to his point on complexity. In this Brooks states "*Software Entities are more complex for their size than perhaps any other human construct".* This expresses Peter Chen's goal in his design of the ER model, in terms of trying to take something complicated and simplifying the model into its optimal function.

Chen's work has played a pivotal role in software engineering, particularly in terms of Computer Aided Software Engineering (CASE) and its fundamental methodologies. The ER model has strongly impacted and influenced most major CASE tools such as Computer Associates '*ERWIN*', Oracle's '*Designer/2000*' and Sybase's '*PowerDesigner*'. In the late 80s and 90s, IBM'S Application Development Cycle framework and DB2 repository were based also on the ER model. The ER model also serves as a foundation for Microsoft's '*ADO.NET Entity Framework'.*
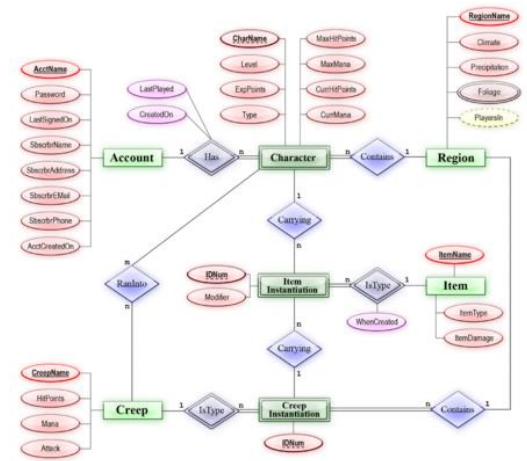
An Entity-Relationship Diagram using Chen's notation.

The ER model has also served as a foundation of Object – Orientated programmed and the Unified Modelling Language (UML) has the ER model deep within its roots. According to Chen himself, UML helps to validate the ER concept and brings the attention of Object – Orientated programmers to conceptual modelling.

To put Chen's influence in to practise, his original ER model paper published in 1976 has been honoured as one of the most influential papers in Computer Science and is still today one of the most cited papers in the computer software field. The impact of Peter Chen can be vividly seen in Software Engineering today when people are developing applications. The ER diagram is one of the most widely used techniques in advancing these applications showing its importance in such large scale system developments.

Furthermore, in the years 1999 to 2006, Chen served as an invited expert of several XML working groups of the World Wide Web Consortium (W3C).

The impact of the '*Entity-Relationship Model'* can be seen in most textbooks on databases, software engineering and information systems analysis. The likelihood of walking into a lecture theatre in college on the topic of information management and seeing the ER model being taught is very likely. Also, the ER model impacts businesses on a day to day basis. Without it, they would not be able to represent and remember information that are essential parts of a businesses' ability to function.

Awards and Honours

Despite Chen's notable accolades for his development of the ER model, he has also been recognised in the field of Information Technology. Other prestigious awards include

- The Data Resource Management Technology Award from the Data Administration Management Association (DAMA) in 1990.
- Achievement Award in Information Management in 2000 from DAMA International.
- Inducted into the Data Management Hall of Fame in 2000.
- The Stevens Awards in Software Method Innovation in 2001.
- The Transformative Achievement Award in 2011 by the Software Engineering Society.

The awards that Peter Chen has received and won over the years is nothing short of incredible and displays the impact that his work has had in software engineering throughout the years but it speaks for itself that there are also several awards named after Peter Chen himself.

- Peter P. Chen Award was established in 2008 to honour excellent researchers/educators for outstanding contributions to the field of conceptual modelling each year.
- Peter Chen Big Data Young Researcher Award was established in 2015 by the Service Society and the Steering Committee of 8 co-located IEEE conferences.

In conclusion, the work of Peter Chen's work on the ER concept has been described as the "*cornerstone of software engineering*". Chen discoveries happened at the right time and place for him and his ability to influence the computer software field has grown since 1976, showcasing him as a software pioneer in his contributions to software engineering.

Bibliography

- https://bit.csc.lsu.edu/~chen/chen.html
- https://channel9.msdn.com/Shows/Going+Deep/Dr-Peter-Chen-Entity-Relationship-Model-Past-Present-and-Future
- http://www.fampeople.com/cat-peter-chen
- https://sigmod.org/publications/interviews/pdf/D.MW-chen-final.pdf?189db0
- http://faculty.salisbury.edu/~xswang/Research/Papers/SERelated/no-silver-bullet.pdf
- https://www.computer.org/web/awards/goode-peter-chen