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Spiking Neural Network Architecture (SpiNNaker)

The SpiNNaker machine, designed and built in The University of Manchester in the UK, can model more biological neurons in real time than any other machine on the planet.

The newly formed million-processor-core SpiNNaker machine is capable of completing more than 200 million actions per second, with each of its chips having 100 million transistors. Biological neurons are basic brain cells present in the nervous system that communicate primarily by emitting 'spikes' of pure electro-chemical energy. Neuromorphic computing uses large scale computer systems containing electronic circuits to mimic these spikes in a machine.

Features of SpiNNaker: SpiNNaker completely re-thinks the way conventional computers work. SpiNNaker is unique because, unlike traditional computers, it does not communicate by sending large amounts of information from point A to B via a standard network. Instead it mimics the massively parallel communication architecture of the brain, sending billions of small amounts of information simultaneously to thousands of different destinations. Researchers eventually aim to model up to a billion biological neurons in real time and are now a step closer.

Projects under SpiNNaker: The power of SpiNNaker has even recently been harnessed to control a robot, the SpOmnibot. This robot uses the SpiNNaker system to interpret real-time visual information and navigate towards certain objects while ignoring others. Neuroscientists can now use SpiNNaker to help unlock some of the secrets of how the human brain works by running unprecedentedly large scale simulations. It also works as real-time neural simulator that allows roboticists to design large scale neural networks into mobile robots so they can walk, talk and move with flexibility and low power.

Source: The Hindu.

Energy Efficiency Revolving Fund

ADB and the EESL signed a USD 13 million grant to be provided by the Global Environment Facility (GEF), for the additional financing of an ongoing ADB-supported project that is promoting end-use energy efficiency.

The grant to be administered by ADB is tied to the USD 200 million ADB-financed Demand-Side Energy Efficiency Sector Project. It was approved by the bank in 2016 to finance the installation of millions of energy-efficient lights on streets and homes as well as energy-efficient water pumps across India.

The ADB funding is helping to establish energy-efficient technologies such as light-emitting diode (LED) street-lights with municipalities while exploring newer technologies and their self-sustaining business models. The existing loan aims to achieve energy savings of around 3,800 gigawatt-hours annually.

Source: The Hindu.

Exercise 'Samudra Shakti'

The aim of the exercise is to strengthen bilateral relations, expand maritime co-operation, enhance interoperability and exchange best practices.

The exercise would start with a Harbour Phase encompassing planning and briefing on various activities, professional interactions, cross deck visits, sports fixtures and social interactions. This would progress to a Sea Phase which include operations such as Joint Maneuvers, Helicopter Operations, Surface Warfare exercise, ASW exercise and Anti Piracy exercises.

The exercise seeks to promote India's solidarity with Indonesia towards ensuring good order in the maritime domain and to strengthen existing bonds between the navies of the two nations.

Source: PIB.

ISRO's GSAT-29

ISRO is set to launch its communication satellite GSAT-29 on its heavy-lift vehicle, the GSLV-MkIII (on November 14).

ISRO is also preparing for a PSLV mission on November 26 to launch HySIS, a new variant of Earth observation satellites, along with 20-30 small commercial satellites.

Source: The Hindu.

Konark Sun Temple

The Sun Temple, an ASI-protected world heritage site, is known for its outstanding architecture. The temple represents a chariot of the Sun God and is one of the World Heritage sites declared by UNESCO. The 13th Century monument was built by King Langula Narasingha Deva by mobilising 1,200 sculptors.

Recently, there are some allegations that the original stone carvings in the temple, as per media reports, had been removed and in their place, plain stones had been fixed.

Source: The Hindu.

Editorial

To Read

A nuanced understanding of the NBFC sector

Despite fundamental differences in the NBFC universe, all NBFCs are today facing the brunt of a liquidity squeeze

Events revolving around the multi-notch downgrade of Infrastructure Leasing and Financial Services (IL&FS) last month have caused a liquidity squeeze for the entire non-banking financial company (NBFC) sector. What started as a debt default by a single NBFC has almost turned into a funding crisis for all. Risk aversion in debt markets has heightened to an extent that the market has lost its ability to make a distinction across NBFCs, bracketing all of them in the same risk category, irrespective of the underlying nature of their assets and liabilities. The reality is that the sector is very heterogeneous and constitutes different types of companies with different business models addressing very different underlying borrower segments. This nuance needs to be seen, understood and acknowledged for markets to resume normalcy.

NBFCs can broadly be divided into three segments—asset financing, personal loans and business loans. The predominant asset financing NBFCs are commercial vehicle financiers. The remaining NBFCs provide a range of personal and business loans with widely varying business models. Housing finance companies (HFCs), which provide housing loans, can be considered as specialized NBFCs that have a separate regulator. Within these broad classifications, there are further differentiations based on the borrower segment the NBFCs target.

While financial markets do exhibit contagion across similar businesses when under stress, the differences in business models and the diverse target segments of NBFCs are stark. And hence, assessing their risks without looking into the nuances of the underlying nature of assets and liability may not give the correct picture. This is most evident in the NBFCs and HFCs focused on the under-banked population, which include micro-finance institutions, used commercial vehicle financiers, small business loan financiers and affordable housing financiers.

Using sample quantitative and quality data from hundreds of NBFCs we work with across sectors, we analysed the current situation. Catering to the requirements of a borrower segment that is different from traditional NBFCs, these lending institutions seem to fare well across multiple risk drivers.

There are three primary drivers of the current risk aversion for NBFCs. The first driver relates to short-term funding being used to finance long-term assets—an asset liability mismatch (ALM). For micro-finance, the weighted average loan tenure ranges from eight to nine months, for commercial vehicle finance, it is 16 to 18 months, while for small business finance, it is 12 to 16 months. Thus, the asset side duration for these businesses is very short.

On the liabilities side, the duration either mirrors the asset side, or is longer, and generally ranges from one to two years. Thus, these small- to mid-sized NBFCs run a positive ALM mismatch. Even in the case of affordable housing finance, where one would expect a wide ALM mismatch, low asset duration for affordable housing financiers reduces the ALM gap to negligible. This is further aided by low leverage and high capital adequacy.

The reason for the excellent ALM profile of lending institutions in our universe is straightforward—loans to the under-banked are small-ticket, short-tenure and fast-amortization. The low asset duration in these NBFCs is thus necessitated by their business model and is not a temporary feature. On the liability side, the long duration is supported by the fact that most debt funding to these NBFCs is sourced from banks and wholesale NBFCs. In both cases, funding is a ‘loan to originate’ and, therefore, broadly maps the cash flows on the asset side.

The second cause of current risk aversion towards NBFCs has to do with refinancing or rollover of short-term capital market borrowings. This concern is linked to the ALM issue discussed above as smooth rollover of shorter duration liabilities when assets are of longer duration is key for business continuity.

In recent years, the share of commercial paper funding to NBFCs subscribed by mutual funds has shown an increasing trend. Commercial paper funding (of up to 90 days) for NBFCs from mutual funds has increased from ₹50,000 crore in March 2016 to ₹1.2 trillion in September 2018. This increase in money market borrowings has come in sharp focus recently as mutual funds have withdrawn from the market for NBFC paper. It is estimated that NBFC and HFC debt of about ₹2.5 trillion is due for roll-over in the next six months. This has led to heightened refinancing risk for those who are dependent on such funding.

The drying up of the money market for NBFC commercial paper has not negatively affected NBFCs catering to the under-banked, as short-term capital market borrowings of these NBFCs are very low. About 99% of the commercial papers issued in India have a rating of A1 or above. In our universe of NBFCs and HFCs, less than 20% of entities have a short-term rating, which is necessary for issuing a commercial paper. Moreover, only 9% of the entities has tapped the commercial paper market in their lifetime.

The third cause for concern has to do with asset quality. This primarily pertains to NBFC exposure to the real estate sector—either as builder funding or loan against property (LAP). Builder funding is non-existent in the loan book of NBFCs in our universe. In the case of LAP portfolio of affordable housing financiers or small business loan financiers, the asset quality continues to be above par as the sourcing of these loans has been outside the ultra-competitive urban LAP market. More importantly, the property underlying the LAP loans is typically self-occupied and not purchased for investment purposes.

Despite fundamental differences in the NBFC universe, all NBFCs are today facing the brunt of a liquidity squeeze. Access to steady predictable debt is their lifeline. For NBFCs with sound fundamentals that are caught in the current situation, a short-term squeeze on funding can be managed by curtailing growth. A prolonged drying up of credit, however, will start impacting them and their borrowers. Over the years, NBFCs have played an important role in providing growth capital to various sectors of the economy. What is required is a concerted effort across stakeholders to prevent a market contagion that can cut off the critical supply of capital to the grassroots of the nation.

Mains Question

Q: National Green Tribunal upholds environmental clearance, but there are other hurdles in the way. Why is this project important for India?